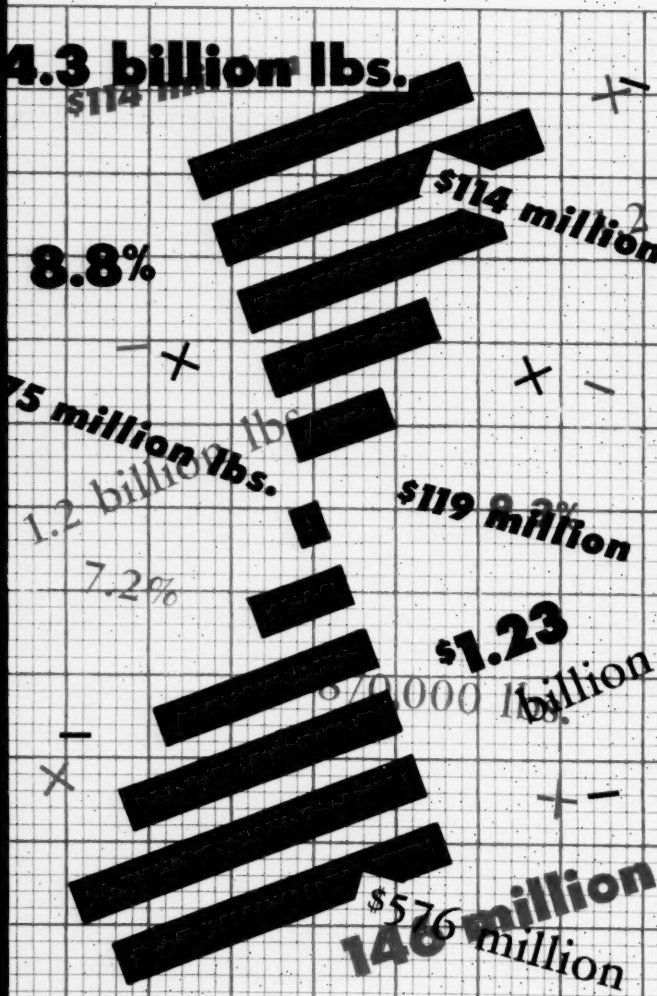
A McGRAW-HILL PUBLICATION

# Chemical Week






September 6, 1958

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Chemical Week

TOP OF THE WEEK SEPTEMBER 6, 1958

- **Pulp and paper output climbs to '57 level** and paper industry's chemical needs will be rising in months ahead .. p. 31
- **Irradiated polyethylene insulates underwater motor** developed by General Electric ..... p. 57
- **Oldest specialties maker, 94-year-old Jacques Romano,** believes in personalized selling of his iodine products ..... p. 65



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# MEMPHIS WATER IS G-O-O-D!

Yes, Memphis' artesian water *is* good! It has traveled through many miles of sand and gravel—receiving nature's best filtering action—to the multi-billion-gallon reservoirs which lie at 500 and 1,400 feet below Memphis.

The water delivered to the Memphis Water Division's customer is potable and dependable. Memphis' artesian water is a soft bicarbonate water, low in sulfates and chlorides and contains no organic matter. This water readily lends itself to production of high-quality water for industrial use and has no taste nor odor. Water well temperature at 500 feet is approximately 65° F.

The Water Division's 108,000,000-gallon-a-day system serves the homes of over 500,000 people and small commercial and industrial firms. Many large commercial and industrial firms have private wells. The Memphis water system is designed to provide the necessary fire flow to fight the worst imaginable conflagration even on a day of maximum demand for water for normal purposes. Because of this, and the City's highly rated Fire Department, Memphis enjoys Class II insurance rates, the lowest available.

Thousands of acres of industrially-zoned sites offer a wide variety of plant locations in the immediate Memphis area. Chemical industries now located here offer many basic intermediates.

In Memphis the combined cost of water, electricity, natural gas, taxes and insurance is lower than any comparable city in the nation. There are many other reasons why Memphis on the Mississippi merits full investigation by site-seeking chemical industries. Get all the facts—mail the coupon today.

Investigate Memphis TODAY

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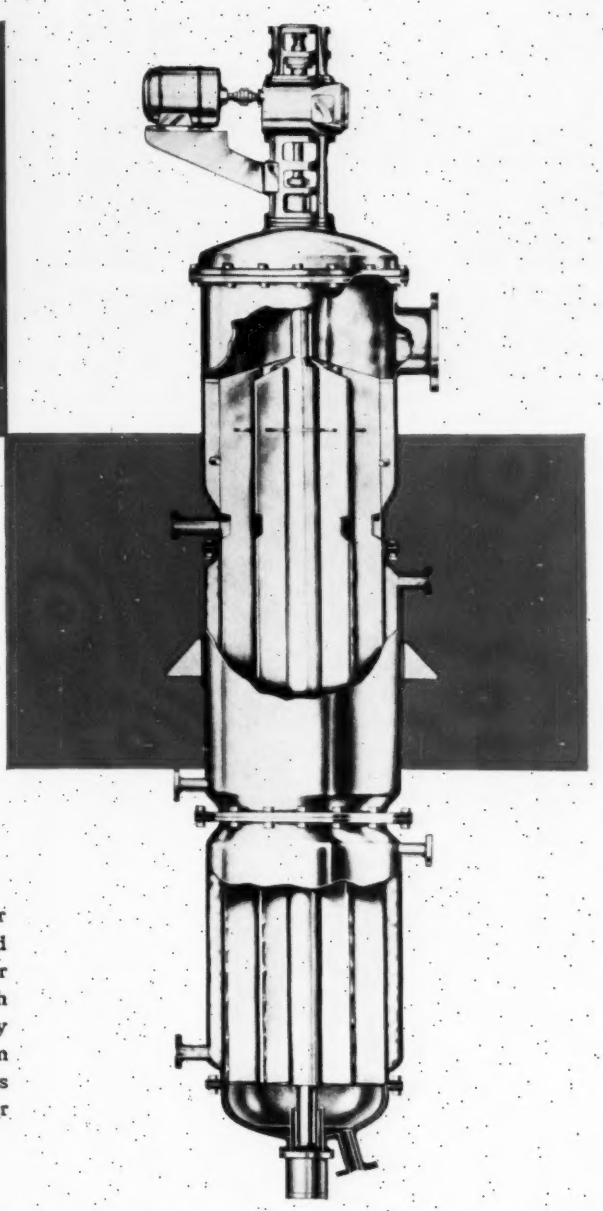
THE RODNEY HUNT VACU-FILM PROCESSOR has an alloy steel shell enclosing the rotor, shaft with wiper assembly, oil diffusion pump, oil seal, vertical condenser and entrainment separator. The alloy steel condenser is finned for efficient heat transfer and is water-cooled or refrigerated with circulating cooling fluid. Distillate and residue are separately discharged by oil-sealed positive pressure pumps. High vacuum is produced by conventional series coupling of high-speed gas ballast mechanical pumps and oil diffusion and oil ejector pumps.

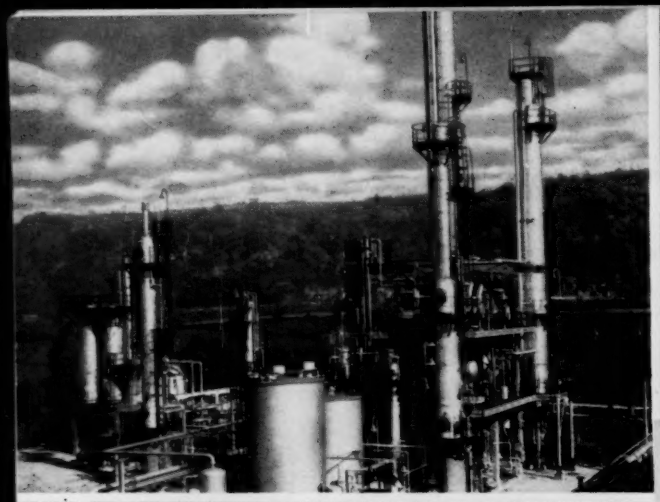
* *Vacu-Film is a trade name of the Rodney Hunt Machine Co. Prior to June 1, 1958, this unit was manufactured under the name "ASCO" Rota Film Still.*

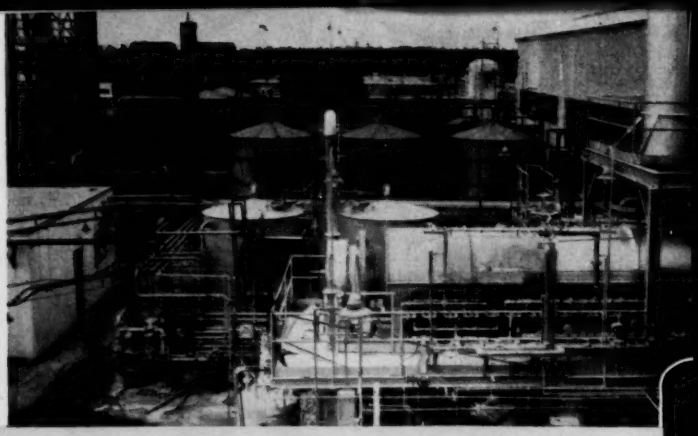


THE RODNEY HUNT TURBA-FILM PROCESSOR consists of a series of rotor blades operating within a thermal section and a separating section—all fabricated of alloy steel. Clearance between the rotor blade edges and the thermal section wall is exactly fixed to assure precise control of the film thickness. Vapor or gases pass upward through the thermal section to the separator from which entrained material is recycled to the thermal section. Steam, Dowtherm or other heating media is distributed in two or more compartments of the thermal section to assure a uniform temperature at the walls.

RODNEY HUNT

AND ENGINEERING





# They bring the "tough ones" to Badger

On these two pages are shown a few of the difficult projects successfully completed by Badger during the past year.

They were tough, but we did them. As a result of accomplishments like these, Badger's growth in '57 was double the previous year's.

Now, we think we have earned the right to an easy assignment. *You* have the right to think that if Badger can do the tough ones so well,

## Badger can do the easy ones better, too

It's worth investigating — and easy. Key Man Service can be yours in a matter of hours — call or write today!

AIChE

**1958—GOLDEN ANNIVERSARY**

*Congratulations from Badger on 50 years of achievement.* All the Directors of Badger Manufacturing Company are Members of the Institute.

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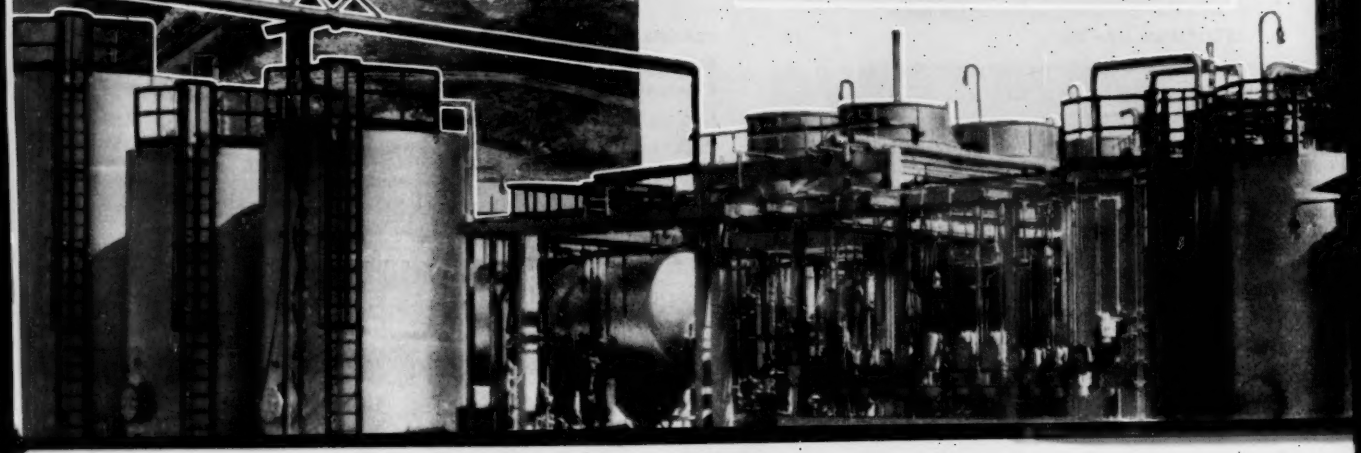
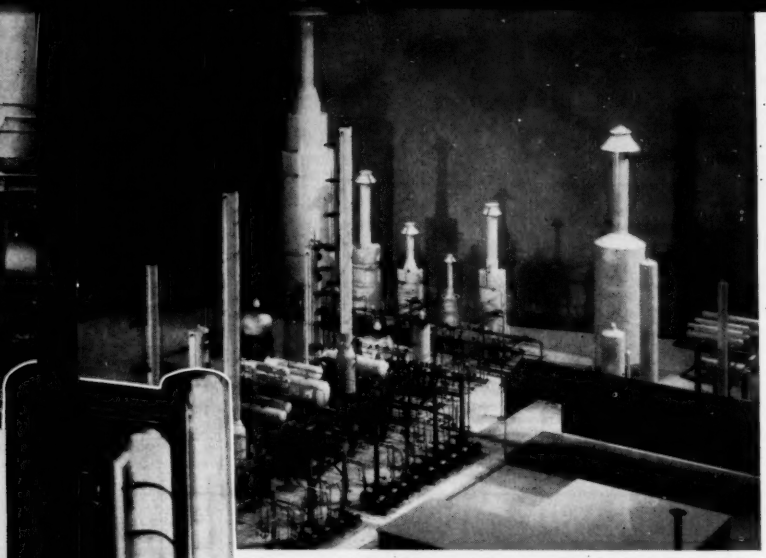
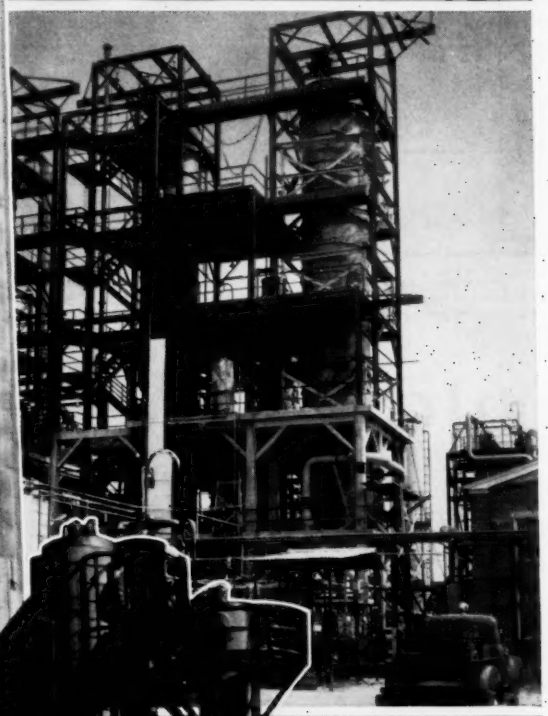
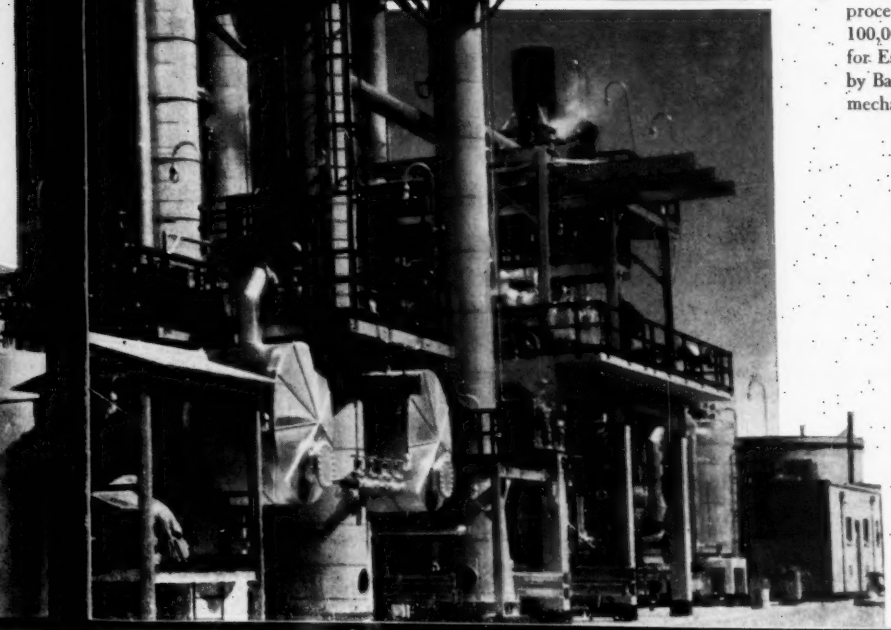









1. **Columbia-National Corp., Pensacola, Fla.** This plant, engineered and constructed for Columbia-National Corporation, will produce 1,500,000 pounds of hafnium-free Zirconium per year.

2. **Jones & Laughlin Steel Corp., Aliquippa, Pa.** Revolution in coal chemicals! For Jones & Laughlin Steel Corporation Badger engineers came up with a new process application that eliminates the conventional acid-washing step to produce near absolute pure benzene and toluene.

3. **Esso Standard Oil Co., Everett, Mass.** One of three current Powerformer projects being handled by Badger. Unit shown is now producing Golden Esso Extra at Esso's Everett, Massachusetts, refinery. Plant was built completely on "stilts" — piles driven deep into tideland marshes.

4. **Metal Hydrides Inc., Danvers, Mass.** A new plant for the production of Sodium Borohydride, a component of "exotic" fuels. Badger handled the engineering, procurement and construction on this job. Plant was ready in record time even though the process was new and tricky.

5. **Cosden Petroleum Corp., Big Spring, Texas.** Styrene from gasoline! Ultra-fractionation and other pioneering process developments made this "impossible" plant a commercial reality. On stream in February 1957, the plant produced better than plastic-grade styrene right from initial start-up!

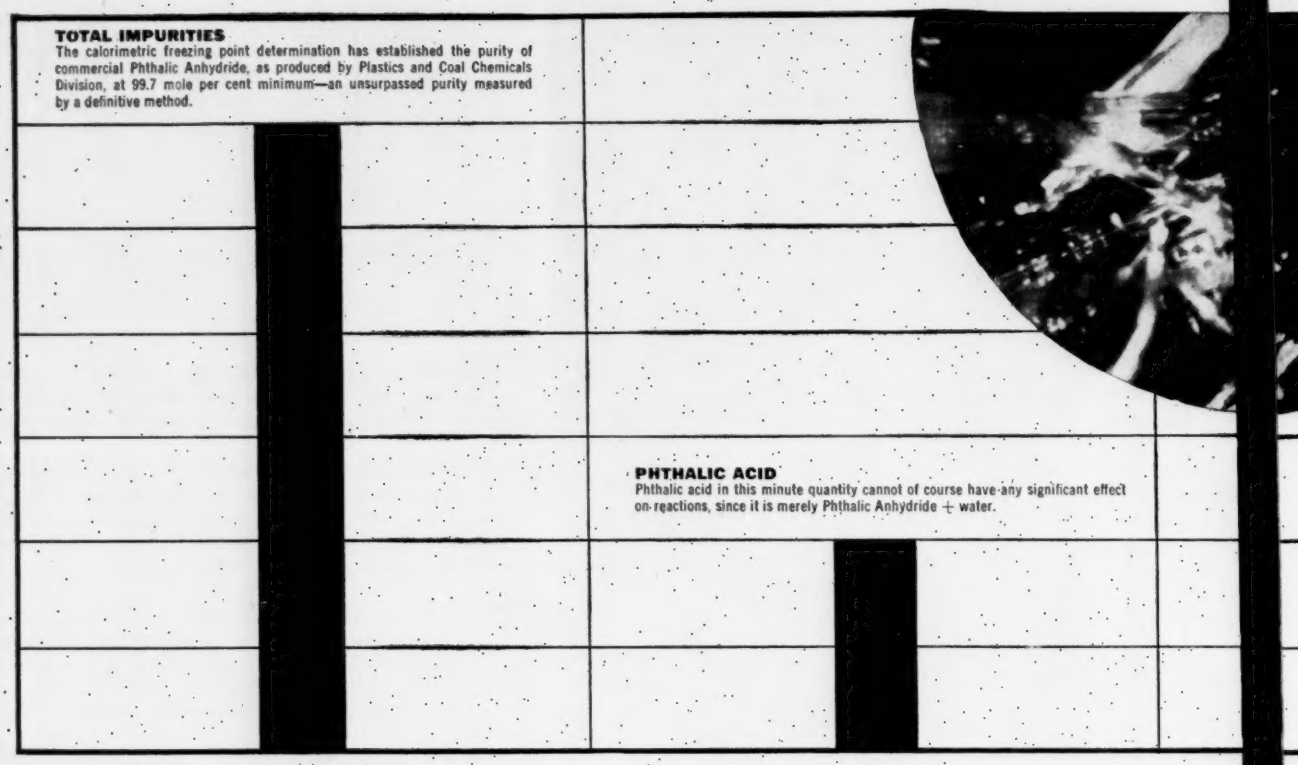
6. **Commercial Solvents Corp., Sterlington, La.** More methanol facilities. This unit is one of four built in recent years for Commercial Solvents Corporation. Like all methanol units designed by Badger, no chemical purification step is used, yet the product exceeds all present purity specifications.

7. **Esso Nederland N. V., Rotterdam, The Netherlands.** Model of two process units similar to those being installed in a complete 100,000 bpsd refinery, now under construction in Rotterdam for Esso Nederland N. V. Badger-Comprimo, owned jointly by Badger and Comprimo N. V., The Netherlands, is prime mechanical, engineering and construction contractor.

### Other current Badger projects

Propane Deasphalting Unit — Anderson-Prichard Oil Corp., Arkansas City, Kansas • MEK Dewaxing-Deoiling Plant — Atlantic Refining Company, Point Breeze, Pa. • HF Alkylation Unit — Champlin Oil & Refining Company, Enid, Okla. • Sulfuric Acid Alkylation Unit — Chinese Petroleum Corporation, Taiwan, Formosa • Continuous Tar Distillation Plant* — Dominion Tar & Chemical Co., Ltd., Hamilton, Ontario • Powerforming Unit** — Esso Standard Refinery S. A., Antwerp, Belgium • Tall Oil Plant — The Glidden Company, Port St. Joe, Fla. • Benzene Udex Unit — Humble Oil & Refining Company, Baytown, Texas • Tall Oil Plant — Monsanto Chemical Company, Nitro, W. Va. • Methanol Plant — Rohm & Haas Company, Houston, Texas • MEK Dewaxing-Deoiling Plant — Sinclair Refining Company, East Chicago, Ind. • Vacuum Distillation Unit — Sinclair Refining Company, East Chicago, Ind. • Paraxylene Plant — Sinclair Refining Company, Houston, Texas • Xylene Udex Unit — Sinclair Refining Company, Houston, Texas.

**Project of Canadian Badger Company Limited*
***Project of Badger-Comprimo N.V., The Netherlands*




The vertical black bars indicate the mole percentages of certain impurities in Phthalic Anhydride of Plastics and Coal Chemicals Division. Notes above each bar describe the tolerance of alkyd resins with respect to that impurity. Thus the chart defines the threshold of purity and proves that this Phthalic Anhydride surpasses it.

# The Threshold of Purity

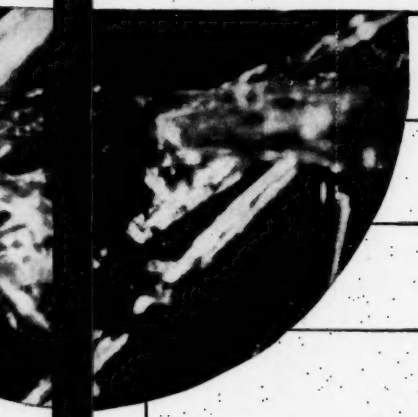
*Out of the laboratories of the Plastics and Coal Chemicals Division comes an important concept: the threshold of purity. Its application to Phthalic Anhydride holds vital significance for producers of alkyd resins, plasticisers and other phthalic derivatives.*

A while ago we told you about the new standard of purity developed for phthalic anhydride by Plastics and Coal Chemicals Division. Now we want to show you how our Research has carried purity investigations a step further—to consideration of individual impurities.

One by one, our laboratories have tracked down the impurities in commercial phthalic anhydride, seeking the limits at which these impurities have no effect on processes and end products. This set of limits may be called the threshold of purity, defined for phthalic anhydride in the chart above. Phthalic users may look there for a precise definition of purity in phthalic anhydride—and for proof that our Phthalic Anhydride fulfills every part of it.

While our researchers have been busy defining the purity of phthalic anhydride, our manufacturing plants have been living up to the definition. Production samples from our four plants are closely checked for conformity in a central laboratory. Here our technical vigilantes pass judgment on the purity and uniformity of the collective phthalic output.

In developing this strict purity definition and abiding by it, Plastics and Coal Chemicals Division has taken the old-time menace out of trace contamination in phthalic anhydride. The threshold of purity concept opens a new age of confidence for the phthalic user, giving him every assurance of ideal kettle performance that modern technology can muster.



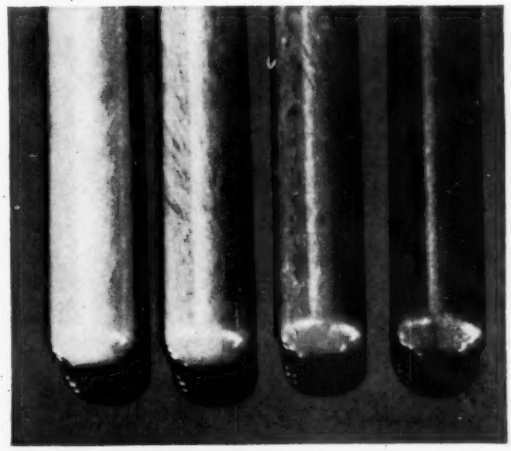



# in Phthalic Anhydride

The impurity naphthoquinone has been studied carefully because of its deleterious effect on phthalic color. In the table below and the corresponding molten samples in the photo at right, you see the progressive deterioration of color as naphthoquinone concentrations are increased.

| *Naphthoquinone* Wt. % based on Phthalic Anhydride | *Alkyd Resin Color* (Hellige) | *Molten Color* (Hazen) |
|---|---|---|
| 0 | 6 | 10 |
| 0.001 | 6 | 25-50 |
| 0.01 | 10 | 100 |
| 0.1 | 12 | 300-350 |

When known concentration of naphthoquinone in our Phthalic Anhydride is substantially doubled (underlined figures), Alkyd Resin Color remains unchanged. Continuing tests of this kind have proved that our manufacturing controls keep naphthoquinone concentrations well below any harmful level.



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Formerly part of the Barrett Division
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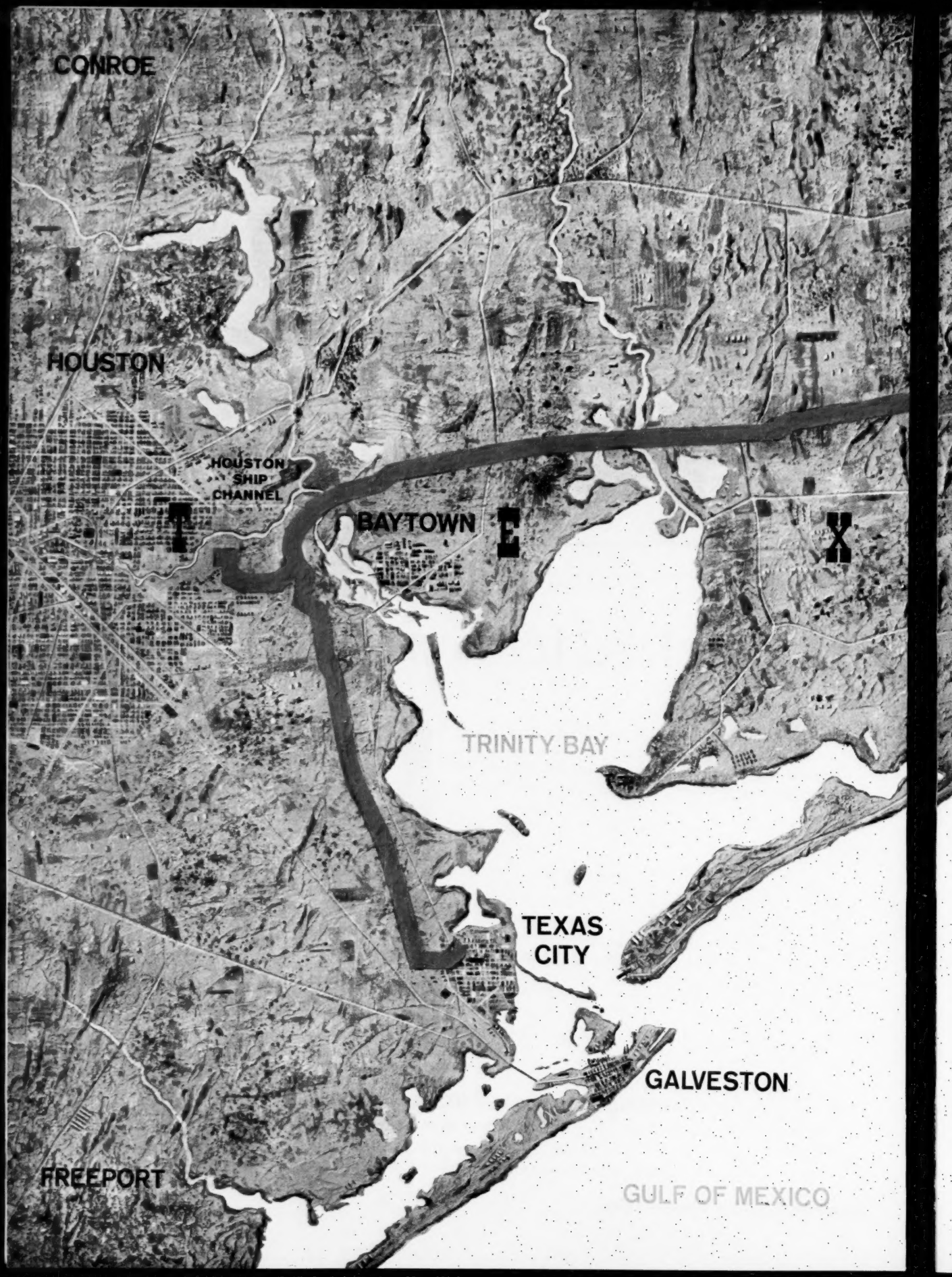
Allied Chemical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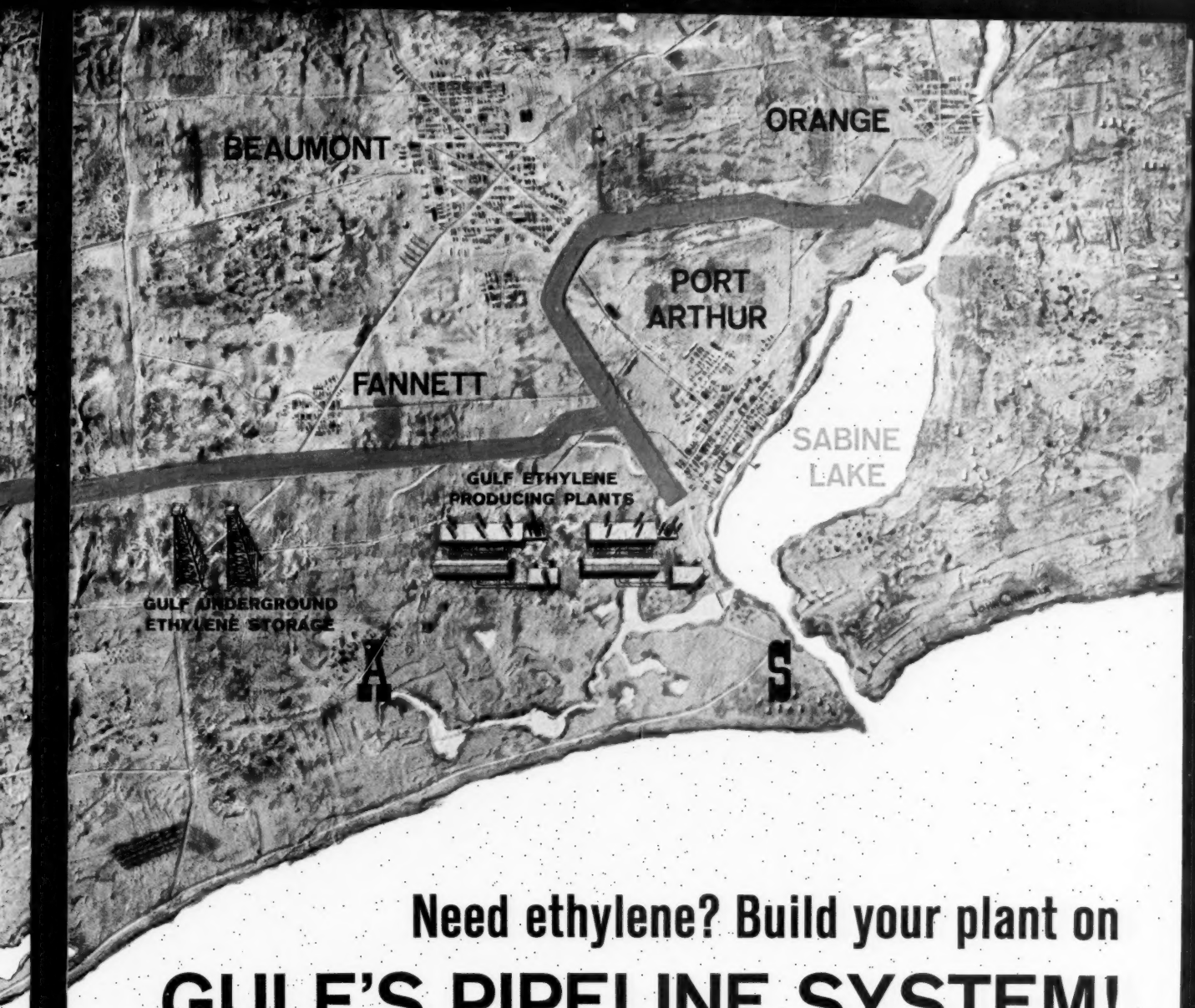


# Need ethylene? Build your plant on GULF'S PIPELINE SYSTEM!

If you're planning a new facility that requires high quality ethylene, investigate the Texas Gulf Coast region served by Gulf's 140-mile pipeline system.

Here you'll find many excellent plant sites in the heart of the Texas chemical producing country. From Port Arthur east to Orange and west to Houston and Texas City, you can have Gulf ethylene at the turn of a valve.

Choose Gulf as your source and you're sure of uninterrupted supply. That's because Gulf turns out a million pounds every day . . . in *two* plants, so you have double assurance of non-stop production. Besides, Gulf maintains reserves of ethylene in underground cavities capable of storing more than a month's output.

Through its ethylene complex, Gulf has delivered more than a billion pounds of merchant ethylene during the past five years. This experience—which no other producer can equal—is at your service.

Gulf ethylene is consistently low in oxygen, carbon monoxide, acetylene, sulfur and moisture concentrations. And constant Gulf research assures continual upgrading of product.

High quality . . . dependability of supply . . . pipeline convenience . . . experience in production . . . these are just some of the advantages of dealing with Gulf. For further details, and a map of the area served by Gulf's ethylene pipeline system, write or phone.

**PETROCHEMICALS DEPARTMENT • Gulf Oil Corporation • Gulf Building, Pittsburgh 30, Pa.**

QUALITY CHEMICALS *from* PETROLEUM

Acetaldehyde, Aromatics, Ethylene, Propylene, Higher Olefins, Methanol, Oxo Products, Pentaerythritol, Sulfur

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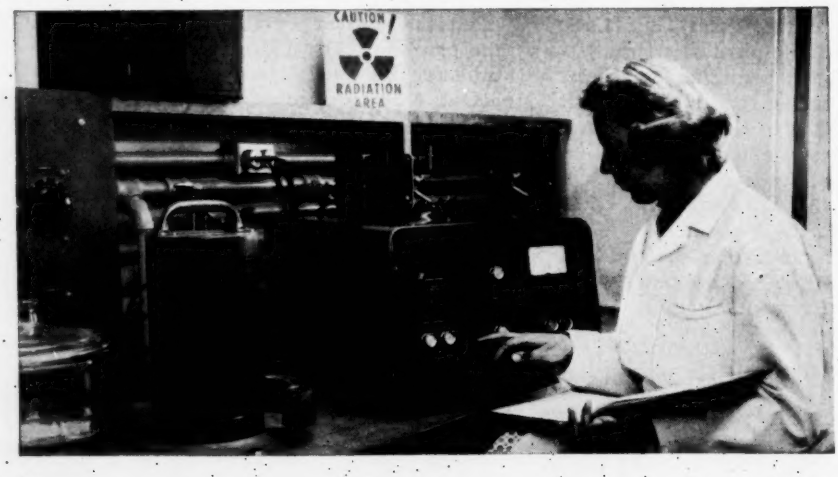
# Life on the Chemical Newsfront

**SPLASHES DON'T MATTER!** High water-spotting resistance is developed after only 24 hours by interior flat wall paints formulated with CYAQUA® *alkyd emulsion*. This unique water-dispersed emulsion makes it possible to formulate paints with the beauty and durability of an alkyd combined with the ease of application and cleanup of a latex. Paints dry quickly, adhere well to all surfaces, develop high scrub resistance, clean up easily with water and have no odor. Processing advantages rival its application benefits. **(Plastics and Resins Division)**



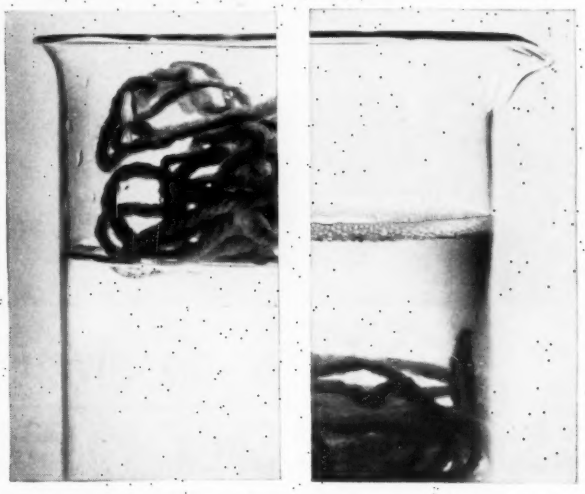

**RADIOACTIVE TRACERS** are among modern research tools being used at the new Cyanamid Research Center at Bound Brook, N. J., to measure efficiency of pigment dispersions in new vehicles. Basic studies are being aimed at a better understanding of the theoretical aspects of pigment vehicle interfaces and at developing new areas of interest to Cyanamid's Pigments Division. In the broad pigment research activities at Bound Brook, major emphasis is being placed on finding new chemical structures with the high degree of durability desired for coloring plastics and exterior finishes. **(Research Division)**

**DURABILITY OF MODERN LAMINATED SCHOOL DESK TOPS** is tremendously improved by the use of urea-formaldehyde resin adhesives. These adhesives are used to hot- or cold-press the plywood cores and also to bond the decorative surfacing laminates to the cores. Adhesives, coating resins and molding compounds are only a few of the end products that have made urea a basic raw material of industry. As the list of such products grows, so does the need for greater and greater quantities of urea. To help meet the growing demand, Cyanamid is now offering AERO® *crystal urea*. Details and technical assistance are available on request. (Industrial Chemicals Division)

®Trademark

*A NEW DISPLAY, illustrating the history of papermaking, has just been added to American Cyanamid Company's exhibit hall at Rockefeller Center, 40 West 49th Street, in New York City. This display also gives particular emphasis to many new and unusual uses for paper made possible by the progress of the Paper Industry. Cyanamid's permanent exhibit hall has created widespread interest, drawing more than a quarter-million visitors so far this year.*

**TO ACCENT A LOVELY LADY'S CHARM** with the exotic orange blossom fragrance of Yara Yara—or to compound a spray that will kill carpet beetles—takes only the versatile intermediate, *beta*-naphthol, and the ingenuity of the chemist in reacting it with other compounds. *Beta*-naphthol combines the economy of a bulk chemical with an excellent reaction potential. Some of its derivatives are staples in today's chemical technology; others are still laboratory curiosities. They range from artificial fragrances and flavorings to dyes and polyethylene antioxidants. Research chemists wishing to evaluate this economical intermediate may find data accumulated by Cyanamid of value. (Organic Chemicals Division)

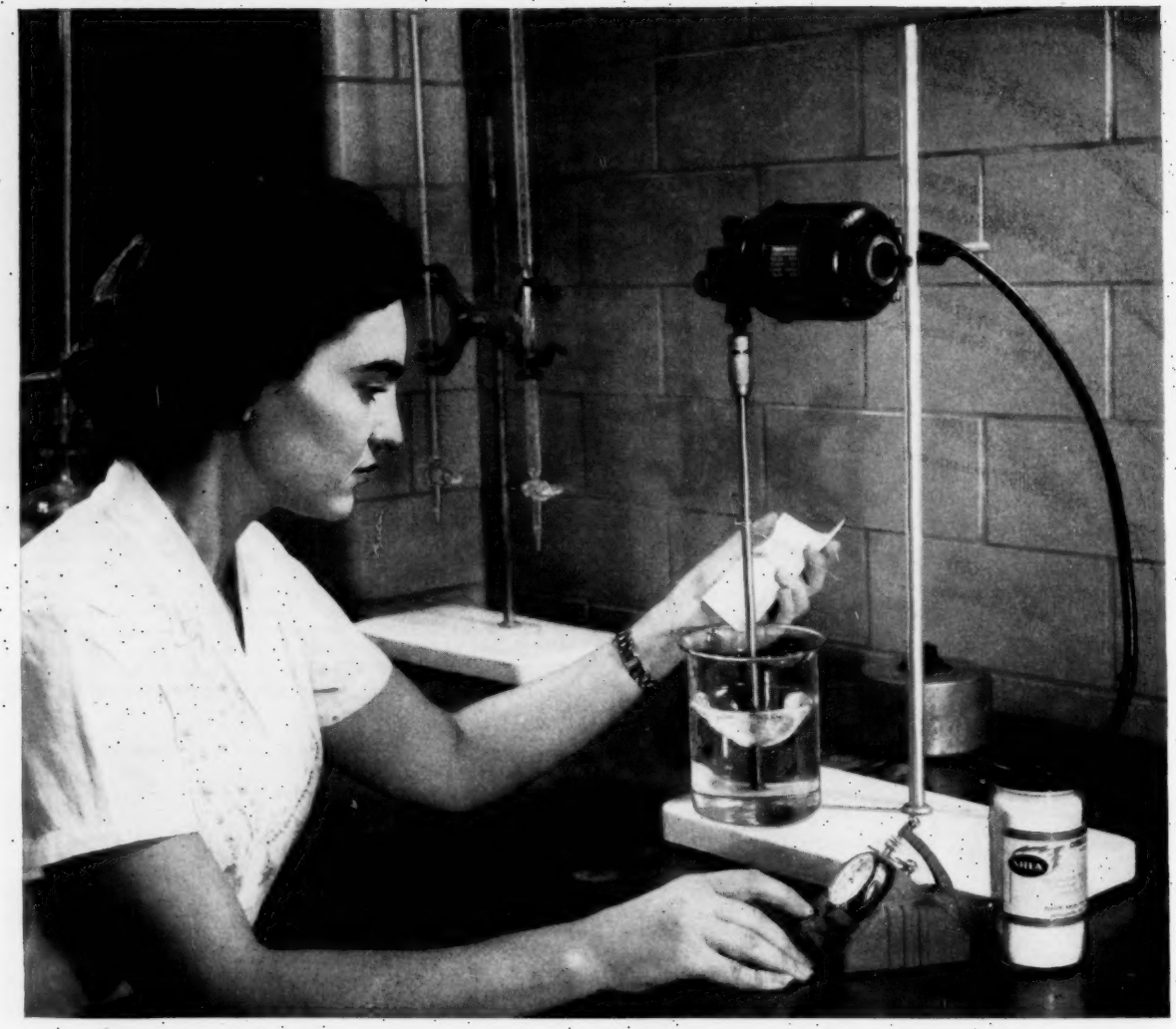


**HIGH WETTING POWER** of DECERESOL® *wetting agents*, important in many textile-treating operations, is demonstrated above. Yarn floats on plain water in the tumbler on the left, but sinks rapidly in water containing 0.025% DECERSOL wetting agent OT in tumbler on the right. This high wetting action promotes rapid wetting out of fabrics in scouring, desizing, bleaching, dyeing, finishing and other processes. Other DECERESOL wetting agents offer unusual combinations of solubility, emulsifying, detergent, salt-tolerance and wetting properties. (Organic Chemicals Division)

**CYANAMID**

AMERICAN CYANAMID COMPANY
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

*For further information on these and other chemicals, call, write or wire American Cyanamid Company*



# For faster-dissolving Tripoly and Tetra get Spray-Dried Shea® Phosphates made only by Hooker

Shea spray-dried sodium phosphates dissolve two to three times faster than conventional types. These hollow, air-filled granules have a large surface area which permits them to go into solution quickly and easily, without prolonged agitation.

**Clear, Haze-Free Solutions**

This exclusive spray-drying process also assures you of clear, haze-free solutions. Spray-dried phosphates will neither bridge nor cake. Because they are relatively dust-free, you eliminate many processing problems. Their 70% greater bulk gives you a detergent package which is 20 to 30% larger—with no increase in price.

Sodium tripolyphosphate content is the highest in the industry—97 to 99%—thanks to our unique processing methods. Tetrasodium pyrophosphate content averages 99% or better.

Hooker can ship spray-dried Shea phosphates by rail or truck from Jeffersonville, Indiana, or Dallas, Texas. Write for free samples and prices, or call your local distributor.

**HOOKER CHEMICAL CORPORATION**

PHOSPHORUS DIVISION

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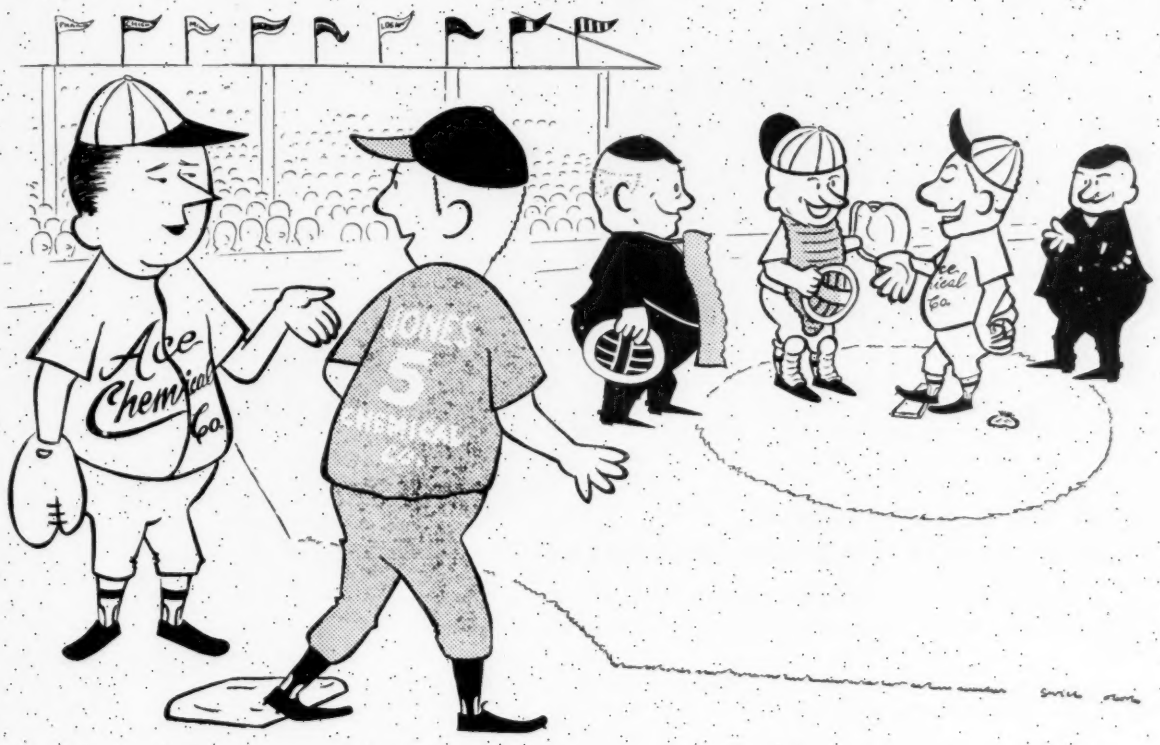
SHEA PHOSPHORUS AND DERIVATIVES

HOOKER CHEMICALS PLASTICS

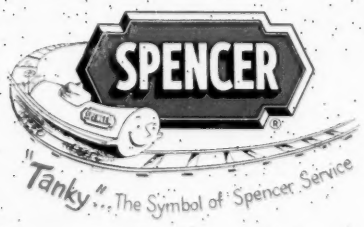



# "They're at it again...telling each other 'Spencer Service Is Wonderful'!"


**Get fast delivery** of Spencer Ammonia from: (1) Pittsburg, Ks.; (2) Henderson, Ky.; (3) Vicksburg, Miss.; or (4) Calumet City, Ill. (Aqua Ammonia only.)

## NEED AMMONIA?...

**Discover for yourself** why so many of our customers say Spencer Ammonia service is wonderful. Whether you use Aqua Ammonia, Commercial Grade Ammonia or Refrigeration Grade Ammonia, write, wire or phone your order to Spencer Chemical Company. Spencer also produces Metals Grade Ammonia, the purest ammonia on the market today. Ask about it!




## SPENCER CHEMICAL COMPANY

*America's Growing Name in Chemicals*

**SPENCER PRODUCTS:** Ammonia (Commercial, Refrigeration and Metal Treating Grades) • Aqua Ammonia • 83% Ammonium Nitrate Solution • Synthetic Methanol • Formaldehyde • FREZALL (Spencer Dry Ice) • Liquid $CO_2$ • Cylinder Ammonia • Nitric Acid • "Brickaid" Brick Additive • "Poly-Eth" Polyethylene • Spencer Nylon • "Mr. N" Ammonium Nitrate Fertilizer • SPENSOL (Spencer Nitrogen Solutions)

**GENERAL OFFICES:** Dwight Bldg., Kansas City 5, Missouri

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## Nopco dispersants make many products better

. . . **IN PAPER** *they minimize the coagulation of pitch, improve felt performance, control slime growth, act as a mordant for dyestuffs*

. . . **IN LATEX PAINT** *they have high versatility as dispersant and suspension agents for pigments*

. . . **IN TANNING** *they protect and set the grain, permit the use of more concentrated and astringent solutions, help oils penetrate more deeply and uniformly*

. . . **IN MANY OTHER PRODUCTS** *they help speed and ease the manufacturing process*

Nopcosant (TM)—Nopco's newly improved and economical series of dispersing agents—is the neutral sodium salt of a condensed napthalene sulfonate. Although its uses are the same as other products of this chemical class, it differs from them in several important ways. If dispersants, solubilizers or tanning aids are at all important to your business, you owe it to yourself to investigate the advantages of Nopcosant. In fact, in any operation where practical chemistry can serve, Nopco can serve. Why not let Nopco chemists have a try at your most urgent problem. Write or call our Technical Research Department. Nopco Chemical Company, 60 Park Place, Newark 1, N.J.

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NOPCO VITAL INGREDIENTS FOR VITAL INDUSTRIES

Lubricants • Detergents • Plasticizers
Softeners • Emulsifiers • Dispersing Agents
Wetting Agents • Defoamers • Thickeners
Vitamins • Foamed Plastics • Sizes

For complete information, see Chemical Materials Catalog, page 378

HARRISON, N.J. • RICHMOND, CALIF. • CEDARTOWN, GA. • BOSTON, MASS. • CHICAGO, ILL. • LONDON, CANADA

# OPINION

## Three, Not Two

TO THE EDITOR: . . . In the interest of truth, please let us give you some brief facts on the electroless nickel situation (*June 28, p. 56*).

General American has been engaged in a vast research program for approximately nine years, based on the original National Bureau of Standards work. Without detracting from the very valuable contribution made by NBS, we pride ourselves on having made chemical plating a commercially desirable process. It is true that our initial interest was in the plating of the interior of tank cars, but our research led us into broader fields.

As a result, we now have three plants (not two), at East Chicago, Ind., Los Angeles, and Sharon, Pa., engaged in the plating of large and small vessels, complicated parts and valves, and many special jobs for Atomic Energy Commission. We have developed methods of continuous plating, increasing the plating rate, improving the adhesion, augmenting the hardness and corrosion-resistance characteristics, and furthermore have led the way in being able to plate on aluminum, magnesium, titanium and nonmetals.

ROBIN DOUGLAS
General American Transportation Corp.
Chicago

## All About 'all'

TO THE EDITOR: The purpose of this letter is to correct a misstatement that been circulating for some time and is repeated in CHEMICAL WEEK on page 25 of the July 19 issue. The statement that Monsanto Chemical Co. organized two subsidiaries in Ohio, one to package and the other to promote and sell the product "all," is not correct.

During World War II, Monsanto began the development of a controlled sudsing detergent, particularly for use in automatic washing machines. However, the company had no facilities for field-testing nor could it interest any soap company, large or small, in [the detergent's] further development and future sale.

I was the principal stockholder in an Ohio corporation organized by me in 1946 for the purpose of assisting in the further development of the product and later its distribution and consumer sale. The name [of the product] was selected . . . by us, and the unique method of promoting its national distribution and sale initially through the appliance distributors was developed by our organization. Nationwide sale through the usual grocery channels followed rapidly.

Monsanto had nothing to do with the product other than to compound it. The company had no financial interest in the organization of Detergents Inc., nor did it take any part in its management or control. The only competition "all" had at that time was . . . the big soap companies, and they made it very difficult. The other company, Eastern Packaging Co., was organized and owned by my family for the purpose of packaging the product "all."

By the year 1952, "all" was the major product used by owners of automatic washing machines. The sale of "all" had sky-rocketed. . . . Earnings before taxes were substantial; but due to a very low excess-profits tax base, it was impossible to finance the capital requirements for its proper development and growth through retained earnings. The best answer for the situation was a sale or merger to change this base. For this reason and this reason only, both firms were sold to Monsanto Chemical Co. in 1953. . . .

MILES M. ELMERS
Custom Coach Corp.
Columbus, O.

# MEETINGS

**"Atoms for Peace,"** second international exhibition, Geneva, Switzerland, Sept. 1-14.

**American Chemical Society,** 134th national meeting, Chicago, Sept. 7-12.

**DCAT,** 68th annual meeting, Sagamore Hotel, Lake George, N.Y., Sept. 11-14.

**Society of Plastics Engineers,** 4th annual regional technical conference; theme: plastics for the automotive industry; St. Clair River Inn and Country Club, St. Clair, Mich., Sept. 12-13.

**American Institute of Chemical Engineers,** national meeting, Utah Hotel, Salt Lake City, Sept 22-24.

# VIEWPOINT

THE PASSAGE, after eight years of controversy, of a workable food additive bill is a triumph for all concerned.

We are happy that the willful distortion of facts and political opportunism that so characterized the early legislative discussions of food additives have been replaced by the enlightened discussion that resulted in this bill.

We are glad that the bill, as passed, leaves to the chemical maker the incentive to produce newer and better food ingredients, that it gives the food industry a better incentive to use such products and, above all, that it gives the consumer full reassurance that he may buy any food product he wants with the knowledge that it is as safe as science can make it.

We are happy, too, that such passage has not been the outcome of another one-in-a-million episode to parallel the elixir of sulfanilamide debacle that spurred the 1938 food and drug act into being.

But passage also highlights some areas that are not as happy:

- Too little has been done to demonstrate to the general public that no reputable chemical company has ever put a product designed for food use on the market without conducting exhaustive safety tests.
- Some firms have used one side of a scientific dispute not to positively promote their own products, but to try to put competitive products into disrepute.
- There is still too much thinking within the Dept. of Agriculture, the Food and Drug Administration and other regulatory agencies that the consumer should not be allowed to choose for himself between food products that make use of traditional or newer ingredients. It may be questioned whether this is in strict fulfillment of their statutory duty of insuring the safety of the food supply.

H. E. Johnson

Editor-in-Chief

# Here's why WEST END can recommend the right product for your special application immediately!

When you phone requesting data on a specific application of a WEST END product or the development of a product to meet new specifications, the Sales Office Manager in Oakland with whom you speak can contact the plant at WEST END immediately. He talks by private wire teletype with the Plant Manager and the Director of Development. An answer is given immediately. It is relayed to you often while you are still on the phone.

WEST END 's Sales Office Manager sales representatives and plant executives work together as a team manning a system that is, in our opinion, uniquely outstanding in the chemical industry. Their confidence in the efficiency of this system is reflected in the enthusiastic, helpful and friendly manner in which they promptly serve you . . . our customers.

**WEST END CHEMICAL COMPANY**
DIVISION OF STAUFFER CHEMICAL COMPANY
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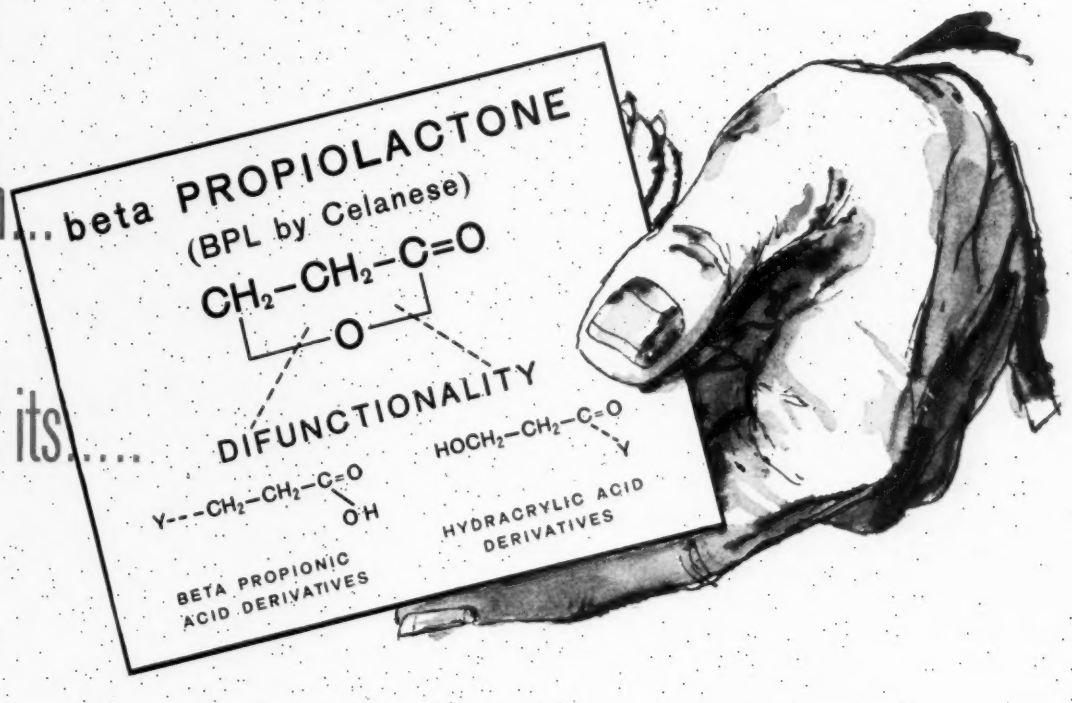
**SODA ASH**
**SODIUM SULFATE**
**BORAX • HYDRATED LIME**

# what can you do with... beta PROPIOLACTONE (BPL by Celanese) and its....




## now available in commercial quantities

Latest news in intermediates is beta-Propiolactone (BPL), a starting material with remarkable versatility—difunctionality—that immediately suggests the synthesis of important new products. How can *you* use BPL—or its derivatives? In starch emulsions? In adhesives? In textile fibers? Why not find out immediately? Write today for samples for your own evaluation, and for technical Bulletin No. N-61. Celanese Corporation of America, Chemical Division, Dept. 552-S. 180 Madison Avenue, N. Y. 16.

Celanese® BPL T.M.

**TYPICAL PROPERTIES OF CELANESE BPL**

| | |
|---|---|
| beta-Propiolactone, wt.%, min. | 97 |
| Physical state | Liquid |
| Color | Colorless |
| Odor | Pungent; acrylic |
| Boiling Point, deg. C. | 162 |
| Refractive index @ 20°C | 1.4131 |
| Specific gravity @ 20/20°C | 1.1490 |
| Pounds per gallon @ 20°C | 9.56 |
| Flash point, Tag open cup, deg. F. | 165 |

Celanese CHEMICALS

*Export Sales:* Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16, N. Y.

**See Chemical Materials Catalog and Chemical Week Buyers' Guide for complete listing of Celanese Chemical Products.**

# SAFE!

## General American terminal keeps alcohol under "lock and key"!

Ethyl alcohol is a "problem" liquid when it comes to storage because close Federal tax supervision holds producers accountable for every gallon. A major producer who stores alcohol in General American's Carteret terminal doesn't have this problem—General American assumes it for him.

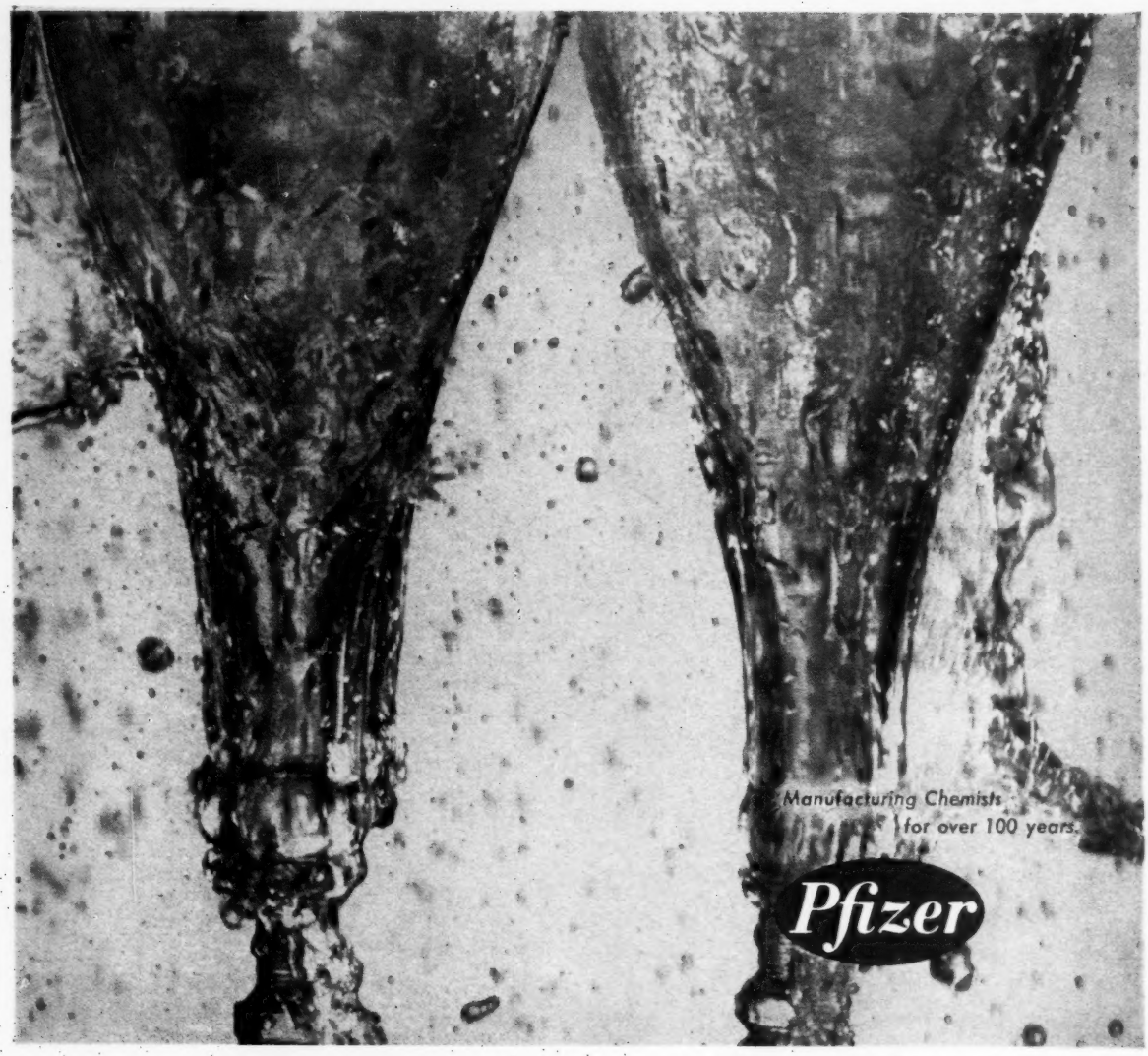
In addition to storage, the terminal provides a variety of services—metering, blending, diluting, denaturing and packaging—all provided with the necessary accountability and accuracy that solves a difficult marketing problem.

If you have a storage problem involving hard-to-handle liquids, call on General American. Leased terminal facilities give you the privacy, safety, flexibility and service of your own terminal—*without capital investment on your part.* Phone or write today. You'll find . . . *it pays to plan with General American.*

Six terminals at five key-market locations with over 14,000,000 barrels capacity: PORT OF NEW YORK (Carteret, N. J.), PORT OF NEW ORLEANS (Good Hope, La.), CHICAGO, ILLINOIS (Bedford Park), PORT OF HOUSTON (Galena Park and Pasadena, Texas), CORPUS CHRISTI, TEXAS.

TANK STORAGE TERMINALS GENERAL AMERICAN TRADE MARK

**GENERAL AMERICAN TANK STORAGE TERMINALS**
a division of GENERAL AMERICAN TRANSPORTATION CORPORATION
*135 South La Salle Street • Chicago 90, Illinois*




# WASH AWAY RUST AND HAZE!

## add Pfizer Gluconic Acid or Sodium Gluconate to your washing solutions

Why add Pfizer Gluconates to your caustic washing solutions? Because, of all commercially available sequesterants sodium gluconate has proved to be most efficient in preventing precipitation of those calcium and magnesium salts which spot your bottles.

***The inclusion of Pfizer Sodium Gluconate in your hot caustic cleaning solutions will result in the following bottle washing benefits:***

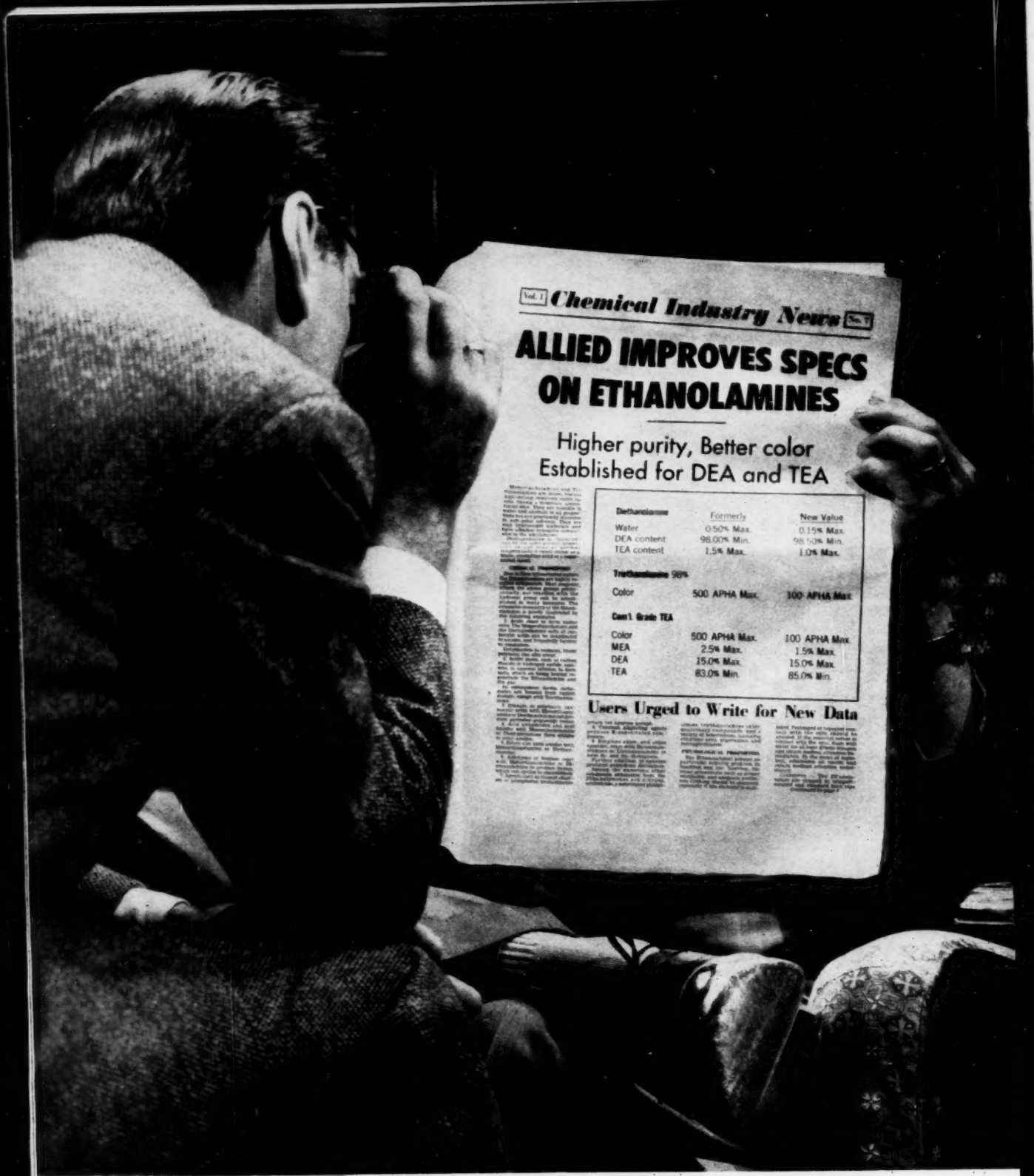
1. Elimination of haze
2. Elimination of rust spots on bottles
3. An increase in the efficiency of aluminum label removal
4. Reduction of maintenance costs

In addition, Pfizer Sodium Gluconate almost entirely eliminates the problem of rust and scale fouling of washing chains, pockets, heating coils, tanks and carrier sections.

Write Pfizer for complete technical data from which you can readily determine what level of sodium gluconate or gluconic acid is required to most effectively increase the efficiency of your bottle washing operations.

5. Prevention of rust and scale on washer equipment
6. Free rinsing and the reduction of caustic "carryover"
7. Stability of solution

**Chas. Pfizer & Co., Inc., Chemical Sales Division**
**630 Flushing Avenue, Brooklyn 6, N. Y.**
Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Texas



# Business Newsletter

CHEMICAL WEEK
September 6, 1958

**Does Olin Mathieson really have its back to the wall,** financially speaking? Rumors to this effect have nourished on such incidents as the recent cut in common-stock dividends, the fact that several officers and directors recently disposed of some of their OM stock holdings, and the change in the company's Standard & Poor's rating, from Bl+ to Bl.

**Nothing to it, says OM management.** On the contrary, company executives tell *CW*, OM—emerging from the recession period with its mammoth expansion program virtually completed—should be in good position to capitalize on its greatly enhanced earning power during the more prosperous years foreseen by most economists.

With 12 new units in operation this year and one more to be in production by next spring, sales and income from established operations are expected to continue their uptrend this fall. And a new peak in sales —assuming no relapse in the general economy—is anticipated in 1959.

As to current criticism that OM (a) has tried to expand too fast, and (b) hasn't fulfilled some observers' expectations (since the company's formation by merger four years ago this week), OM management points out:

- The great bulk of new capital investment is in establishing an integrated aluminum operation—and economic considerations dictate that such plants be large, modern, and completed as promptly as possible.

- Performance of new units completed prior to 1957 was muted by the recession; and the big new aluminum plants, as well as the high-energy fuel plant, are just starting up.

OM still plans to sell some of its properties during the next few months (*CW Business Newsletter, Aug. 30*)—but stresses that these spin-offs will be relatively small "odds and ends."

•

**Latest earnings reports and dividend payments** continue their divergent ways.

**Spencer Chemical reports earnings dropped 21%** during the fiscal year ending June 30. The '58 total: $4 million. Sales slipped 6.5% —to $45.1 million—due largely to the spring slump in farm demand for nitrogen products. Agricultural products accounted for only 47% of last year's total sales, compared with a 53% share the year before. But polyethylene and nylon resin sales picked up 13%, accounted for 34% of total sales, against the previous year's 28%.

Net working capital dropped $2.7 million. But along with most chemical companies, Spencer declared a regular third-quarter (calendar) dividend.

**The industry, in fact, boosted dividend payments 2.7%** during the first seven months of '58, compared with the same period in '57, the

latest Commerce Dept. figures show. Payments by all manufacturers, in contrast, dropped slightly.

Last week's dividend notices reflect the trend in chemicals. Hercules, Commercial Solvents, and Pan American Sulphur all declared their regular dividends.

**And an extra dividend of $1.50/share,** along with its regular 75¢/share payment, was declared by American Agricultural Chemical Co. Unlike Spencer, American Ag felt an agricultural chemical sales surge during the fiscal year that ended June 30. Per-share earnings rose from $7.41 to $7.78.

•

**Add another to the growing list of companies getting into atomics** (*see p. 29*). United Western Minerals, which owns oil and gas properties on more than half a million acres in three Western states, is actively negotiating to start up a fully integrated uranium business.

Though the company stresses that the deal is still in the talking stage, UWM—headed by Maj. Gen. Patrick J. Hurley (Ret.)—hopes to acquire 80% of the stock of a privately owned firm in Santa Fe, N.M. The latter is licensed by AEC to sell uranium salts, oxides and metals. If the acquisition goes through, UWM would build a $7-9-million plant to mine and process the compounds, selling finished products for use in commercial reactors.

**Michigan Chemical last week privately placed $4.6 million** in 5½% promissory notes to help finance its new sea-water magnesium plant in Port St. Joe, Fla. (*CW, July 19, p. 27*).

•

**Joining the list of farm cooperatives** expanding in fertilizer production is Cooperative Farm Chemicals Assn., blueprinting a new 100-ton/day ammonia plant and a 30-tons/day urea plant for its complex in Lawrence, Kan. The ammonia unit will have additional capacity to provide for expansion. Completion of the projects is slated for Aug. 31, '59.

•

**Union Carbide is spurring Indian chemical development.** Its Bombay-based subsidiary, National Carbon Co., is pushing construction of an $8-million petrochemical plant, slated to go onstream in '60. Products: polyethylene resins (6 million lbs./year); a range of solvents, including butyl alcohol, butyl acetate, ethyl acetate, other acetic esters; acetic acid, ethylene dichloride, and a number of other chemicals.

•

**Two well-known makers of chemical specialties are merging.** Drackett Co. (Cincinnati) is purchasing the assets of Judson Dunaway Corp. (Dover, N. H.). Drackett produces Drano, Windex, and Twinkle copper-cleaning compound; Judson Dunaway's line includes Bug-A-Boo insecticides, Expello mothicide, and Vanish and Delete stain removers. Each company has three plants.

## HOW THE SILICONES MAN HELPED...
## PROVIDE THE "SLIP" THAT STOPS SKIDS

IN A TIRE TREAD every slot, every angle must mold perfectly according to the design—because the total stopping safety of the tire on the road is the sum of all the grooves and biting edges.

Even complicated thin-groove treads slip easily out of molds with the correct UNION CARBIDE Silicone release agent. It prevents rejects due to sticking, and minimizes mold cleaning. For molded plastic parts, Silicone Fluids do the same kind of job.

For the manufacture of a growing variety of improved and new products, UNION CARBIDE also supplies Silicone Rubber compounds and gum stocks. Properties include flexibility at very low temperatures, stability at very high temperatures, extremely low compression set, and extraordinary resistance to weather, electricity, ozone, and oil.

Whatever rubber or plastic product you make, you may find a better way to make it—or a way to make it better—by talking with a UNION CARBIDE Silicones Man. Contact our distributor, C. P. Hall Co., with offices in major cities, or write Dept. IC-4802, Silicones Division, Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. *In Canada:* Bakelite Company, Division of Union Carbide Canada Limited, Toronto 7, Ontario.

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UNION CARBIDE TRADE-MARK SILICONES

# TEAMWORK YIELDS BETTER PRODUCTS FROM HURON

## New improved Huron® Instant Starch example of plant-lab cooperation

The development of new improved Huron Instant Starch—the starch that dissolves readily in hot or cold water—was no accident. It reflects Huron's more than 50 years of experience and leadership in the starch field plus close cooperation between Hercules Research Center in Wilmington, Delaware, and the Huron Milling Division Plant in Harbor Beach, Michigan.

This combination of experience, research facilities, and modern production talents assures a continuing re-evaluation of Huron products. That's why for the best today and tomorrow—you can look to Huron.

**RESEARCH**—On this spacious site outside Wilmington, Delaware, Hercules maintains one of the most extensive research laboratories in the chemical industry. It is here that the entire line of Huron starches and the basic chemistry involved in their manufacture are continually studied. Such research is just one reason for Huron leadership.

**PRODUCTION**—At Harbor Beach, Michigan, this modern plant produces Huron starches. The finest in equipment and quality control methods mean you can depend on Huron starch products for consistent results every time. Production knowledge is another indication of the experience that stands behind every starch in the Huron line.

**HURON MILLING DIVISION**

*Virginia Cellulose Department*

HERCULES POWDER COMPANY

INCORPORATED

*900 Market Street, Wilmington 99, Delaware*

VH58-6

## NUCLEAR DEVELOPMENT: *the pace quickens*

***Present Program:*** **25** ***reactors by 1965***

***Proposed New Program:*** **46** ***reactors by 1968***

| | | | |
|---|---|---|---|
| *In operation—* **8** *as of 1958* | 3 boiling water<br>2 pressurized water<br>1 sodium-graphite<br>1 experimental breeder (small)<br>1 experimental homogenous (small) | *Already under study—* **5** *to be in operation by 1962-'67* | 2 heavy water<br>1 gas-graphite<br>1 intermediate breeder<br>1 water-graphite |
| *Under construction or under contract—* **10** *to be in operation by 1959-'62* | 4 boiling water<br>2 pressurized water<br>2 fast breeder<br>1 sodium-graphite<br>1 sodium-heavy water | *Recommended for study—* **16** *to be in operation by 1962-'68* | 2 organic<br>2 liquid metal fueled<br>2 advanced industrial<br>2 boiling water<br>1 pressurized water<br>1 steam-heavy water<br>1 fuzed salt<br>1 process heat<br>1 aqueos homogenous<br>1 sodium breeder<br>1 high-temperature sodium-graphite★<br>1 high temperature gas-graphite★<br>★ or heavy water |
| *In planning—* **7** *to be in operation by 1960-'65* | 1 heavy water<br>1 gas-heavy water<br>1 boiling water<br>1 aqueous homogenous<br>1 organic<br>2 others not decided | *From Present Program* **25** *See left* | |

# For CPI—Nuclear Scene Goes Critical

**Industry's stake in atomics markedly increased last week as a rash of new developments — all tending to speed the commercialization of nuclear energy—broke out across the country.**

• The Joint Congressional Committee on Atomic Energy — whose Democratic majority has long been irked at what members call "foot-dragging" on the part of the Atomic Energy Commission—put out a proposed plan aimed at attaining economic nuclear power by 1970 (*table, above*). Chemical process companies would play a vital role.

• At the same time, industry was trying to assess the technical breakthrough scored by AEC's Arco, Ida., plant in successfully operating a plutonium-fueled reactor (*CW Technology Newsletter, Aug. 30*).

• Eight chemical companies reported varying degrees of progress on a raft of nuclear processing projects.

• And the U.S. and Britain offered—subject to Russia's promise to follow suit—to stop testing nuclear weapons after Oct. 31.

**Power and Prestige:** The U.S.—blessed with plentiful supplies of coal, oil and natural gas—won't soon have a pressing need for atomic power. But government leaders are generally agreed that we must nevertheless push ahead to maintain world technological

leadership. Secondarily, they say, the U.S. should be ready for the day when fossil fuel supplies run low.

Accordingly, the new reactor development plan put forward by the joint committee's staff sets three broad goals: (1) U.S. world leadership in peaceful uses of atomic energy; (2) economic atomic power by 1968 in friendly countries that have high fuel costs; (3) attainment of competitive nuclear power in the U.S. by 1970.

So far, the staff document is only a recommendation, based on a series of conferences held last fall by representatives of AEC and the joint committee. The committee is asking for comments from industry, will hold a seminar sometime this fall to clarify industry's reactions. After that, AEC and the joint committee will try to agree on what kind of a program to adopt.

**Bigger Outlays:** Combined cost to the federal government and industry is estimated at $875 million over a seven-year period—plus continuation of AEC's basic program of reactor research and development at a level of $125-150 million/year.

Private industry would get a crack at the proposed new projects—and government help would be offered to companies interested in "partnership" development. But the rules would be tighter, aimed at avoiding the kind of delays that have plagued the cooperative power demonstration program up to now.

The committee staff estimates that, as experience is gained and some projects are weeded out, only about half of the suggested reactors would actually be built. And the staff notes that the expanded program does not include reactors now operating, under construction, or in planning; nor does it include any reactors of other types that may be built by private industry.

**Attack on Costs:** The staff reasons that present high costs of nuclear power stem from high capital costs of reactors and from high costs of the fuel cycle. To reduce fuel cycle costs, the staff urges a stepped-up research program working toward:

(1) Cheaper fabrication of fuel elements offering longer life and greater total burnup.

(2) Improvement of fuel element cladding and plant structural materials, to allow production of higher temperature steam.

(3) Cheaper reprocessing, involving development of improved methods for separation and recovery of uranium, plutonium and useful isotopes, "as well as pyrometallurgical methods to rejuvenate fuel."

(4) Cheaper waste processing and disposal, including ways to utilize atomic wastes in economic and beneficial ways.

(5) Use of plutonium and natural uranium as reactor fuels. This involves recycling plutonium with natural uranium.

**Chemical Companies Moving In:** Meanwhile, chemical process companies are continuing to move in on the nuclear field. Last week brought these developments:

Olin Mathieson began assembling reactor cores at its nuclear fuels plant at Montville, Conn. Minnesota Mining & Mfg. disclosed it would start full production of custom-made ceramic nuclear fuel elements through its subsidiary, American Lava Corp., at Chattanooga, Tenn. And Uranium Reduction Co. (Salt Lake City) rang up the first commercial sale of uranium concentrate. Customer: W. R. Grace's Davison Chemical Division, which will convert the concentrate (at Erwin, Tenn.) into uranium oxide and metal for use in reactors.

Early next year, Allied Chemical's General Chemical Division will start up the nation's first privately owned nuclear feed material plant. This will be a uranium hexafluoride unit at Metropolis, Ill., that will double U.S. capacity for this heavy gas. AEC has contracted to buy total output—5,000 tons/year—for five years.

American Cyanamid is building a new radiation and ionization center at Stamford, Conn. to study radiation-induced chemical reactions. The Texas Co. started operating its radiation-reaction laboratory at Beacon, N.Y. Next month, National Lead Co. will begin making nuclear fuel at its Albany, N.Y., plant. And General Dynamics will study feasibility of a new concept of propulsion by controlled nuclear explosions.

For chemical companies, new opportunities for nuclear enterprises are opening each month. And an East-West treaty to halt production of nuclear weapons—if it can be negotiated—might well lead to intensification of efforts to develop peaceful atomic applications.

## Plastics Pad Nopco Net

**With polyurethane demand picking up, Nopco Chemical Co. (Newark, N. J.) management last week predicted that 1958 sales will total about the same as '57's $28 million and that next year's will show a 15% increase.**

Earnings also should be up substantially next year, says company president Ralph Wechsler, although this year's profits probably will be about 10% less than the $1.6 million netted in '57.

Wechsler concedes that he—along with others in the industry—was overly optimistic about the timetable for growth of urethane markets.

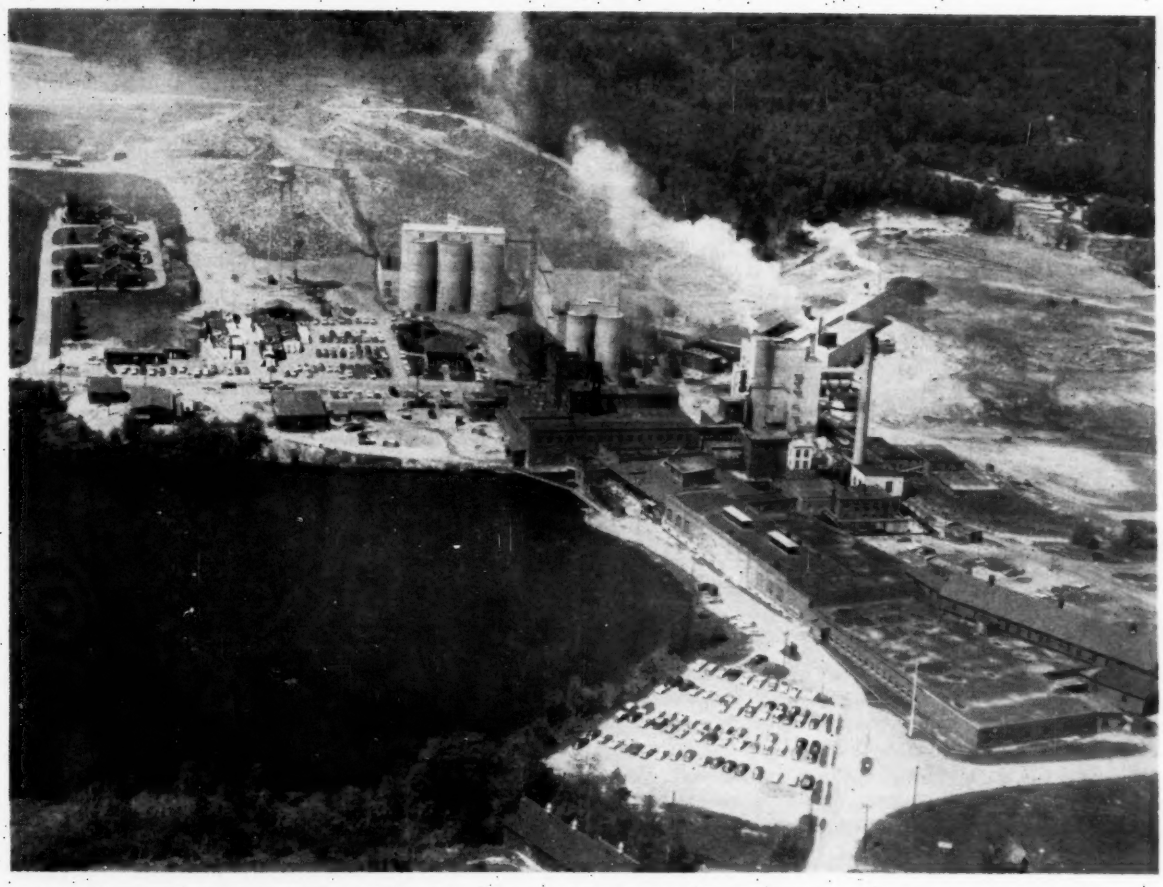
He still feels that this material will reach the peaks that were predicted for it several years ago, although later than first estimated.

Nopco's Plastics Division — which specializes in urethane foams and intermediates such as polyethers and polyesters—lost about $500,000 in 1956 and again in '57, Wechsler told security analysts in San Francisco. But he expects that this loss will be cut in half this year and that 1959 will "see the end of the red ink". Among the newer applications brightening urethane prospects: insulation for refrigerator trucks and lightweight prefabricated military huts.

**Pace-Setting Plastics:** In sales, the Plastics Division is the company's fastest-growing unit. It moved $600,000 worth of products in 1956, $1.4 million in '57, and expects to sell $2.5 million worth this year and $4-5 million in '59. But Nopco's two older divisions, Industrial Chemicals and Vitamins and Fine Chemicals, still provide the bulk of the income—about 55% and 37% of sales, respectively. Industrial chemical sales lost ground during the recession, but this was offset by the other divisions' gains.

Research expenditures this year will rise to about $1.25 million, or 4½% of sales—high-water mark for this company. Capital expenditures have been in the $1-1.25 million range in each of the past two years, will probably hit $1 million next year.

Wechsler said any merger would have to be in line with Nopco's present interests, but that no acquisitions are on the immediate horizon. Accordingly, he added, there are no present plans for diversification or for new financing.



**Pulp and paper mills, such as Eastern Corp.'s new unit in Lincoln, Me., step up output as orders peg . . .**

# August '58—Pickup Month for Papermakers

**Things are looking up this week for one of the chemical industry's best customers—the pulp and paper industry. Preliminary four-week August figures show that paper and board output-to-capacity ratios are about equal to those of the comparable period last year: 90% for paper and 92% for board versus 91% and 94% in August of '57.**

This is a sharp improvement over previous monthly totals, which found operating ratios lagging an average of 8% behind those of a year ago.

Moreover, pulp and paper executives are counting on a gradual rise for the rest of the year, with the fourth quarter slated to show the biggest gains of all.

In fact, by the end of '58, production of all grades will be over 30 million tons, estimates the American Paper and Pulp Assn. That's still below last year's output, but far from disappointing.

**Upturn in July:** The first hint of an upturn came in July, normally far less productive than the rest of the year, because of annual vacation periods. It was then that production-capacity figures first approached '57's. But because of summer holiday, the pickup was less marked.

Now, the majority of top paper company executives have a more solid basis for optimism. Says David Luke, president of West Virginia Pulp & Paper: "The prospects for increasing volume and higher activity are encouraging . . . the upturn is continuing and has all the earmarks of a genuine business recovery." And John Hinman, chairman of the world's biggest paper company, International Paper, says: "We now look for a pickup in volume for the rest of '58."

These sentiments were echoed by William Adams, St. Regis Paper Co. chief executive, who noted that orders have been mounting. "This favorable trend should continue through November," he predicts.

**Earnings Down 20%:** But these and other executives point out that the recession did slice plenty from sales and profits in the first half of '58—especially during the first three or four months. The American Paper and Pulp Assn.'s quarterly survey of some 91 companies—which account for just about half of paper industry sales—shows earnings for the first half of '58 to be 20% lower than those of the same period last year. Sales slumped about 2½%.

The second quarter, however, was a little more encouraging. Sales edged up about 2%, compared with the first, with earnings steady.

First-half figures also reveal that large diversified paper companies did better than their smaller competitors. And all signs indicate that this will hold true for the rest of the year.

**Overcapacity to 1960:** Executives of

## SALES, EARNINGS: MOST MAJOR PAPERMAKERS POST GAINS

| | *Sales ($ million) 2nd qtr. '58* | *Change from 1st qtr.* | *Earnings ($ million) 2nd qtr. '58* | *Change from 1st qtr.* |
|---|---|---|---|---|
| International Paper | 223.2 | up 0.2% | 14.1 | down 12.8% |
| Crown-Zellerbach | 114.8 | up 5.4% | 7.7 | up 18.7% |
| Kimberly-Clark | 82.9 | down 2.6% | 5.8 | up 0.9% |
| St. Regis | 90.7 | up 11.2% | 4.3 | up 20.9% |
| Scott Paper | 71.0 | up 0.5% | 5.5 | up 4.2% |
| Mead Corp. | 58.9 | up 9.3% | 2.3 | down 2.4% |
| W. Va. Pulp & Paper | 52.0 | up 8.5% | 2.8 | up 46.6% |
| Champion | 40.5 | down 5.0% | 1.8 | down 27.9% |
| Marathon | 40.1 | up 7.7% | 1.8 | up 25.0% |
| Union Bag Camp | 36.9 | unchanged | 3.4 | unchanged |

the smaller firms voice a less favorable forecast.

One of the typical views: that of S. D. Warren Co. President George Olmsted, Jr., who believes overcapacity will continue to impair profits until 1961—perhaps even longer. Said Olmsted, "I see a gradual improvement starting in October, but no boom until 1961." He did say, however, that the company's earnings will be between $2.50 and $2.75/share, which compares well with the $2.75 earned in '57, but short of the record $4.31/-share chalked up in '56, the company's biggest year.

The larger diversified firms remain optimistic. Besides expected seasonal gains, and a general upturn in the economy, diversification is a strong factor underlying their optimism.

One major trend is to production of plastic films as laminating products or, on a smaller scale, as transparent wrapping materials *(CW, August 26, p. 24)*.

**Plunge into Plastics:** Crown Zellerbach already is marketing Crown Seal, made of polyethylene resin purchased from Spencer Chemical; Ludlow Paper, Inc. got into the business on a large scale last month; and Mead Corp. has confirmed plans to market transparent film. Several others are seriously considering the plunge but have not yet drafted firm plans.

There's little doubt that transparent films will strongly challenge some paper wrappings. A sales manager of one of the largest U.S. paper firms says, "We don't use the word plastic around here without disguising our voice."

**Happy Marriage Foreseen:** But there's also the possibility that plastic and paper will be mutually beneficial. Papermakers are thinking of plastic films as laminators for products such as multiwall bags and wrappings. Object: to impart strength and better sealing qualities.

And, where bread wrappers—for example—are concerned, the papermakers contend that paper-film combinations are more likely than film alone. One reason: paper-film combinations are said to make for easier-to-read labels, greater impact for visual advertising messages. Moreover, they say, the added expense of film may be too much for many packagers. Many resin makers dispute some, or all, of these points.

But even if the films gain wide acceptance, papermakers probably won't make plastic for film. All agree, the change-over and new equipment would be too costly. Thus, chemical resin suppliers may have a stable new market for polyethylene and some other plastics, which are, admittedly, in oversupply.

Although the packaging business is substantial, it's a relatively small percentage of total paper demand—and the competition from film is not likely to substantially disrupt chemical sales to papermakers. Chemical methods for making paper are solidly established, won't change quickly. And as the fortunes of the paper industry rise, so will its already vast requirements for chemicals.

## OUTPUT IN RECESSION: DROPOFF IS SLIGHT

| | *1st 6 mos. 1958 (tons)* | *1st 6 mos. 1957 (tons)* | *% change '58 vs. '57* |
|---|---|---|---|
| Newsprint | 862,236 | 944,296 | down 8.7% |
| Fine Paper | 781,666 | 774,370 | up 8.7% |
| Coarse Paper | 1,745,414 | 1,882,601 | down 7.3% |
| Paper-Machine Coated Printing & Converting | 809,060 | 782,722 | up 2.1% |
| Book Paper, uncoated | 810,557 | 827,097 | down 2.0% |
| Special Industrial | 287,393 | 338,667 | down 13.9% |
| Sanitary Tissue Stock | 857,349 | 837,207 | up 2.8% |
| Tissue, ex. Sanitary | 114,222 | 125,871 | down 9.3% |
| Groundwood Paper, uncoated | 401,537 | 440,822 | down 8.9% |
| *Paper Total* | *6,669,434* | *6,958,053* | *down 4.1%* |
| Container Board | 3,585,903 | 3,859,496 | down 7.1% |
| Bending Board | 2,141,436 | 2,124,292 | up 0.8% |
| Non-Bending Board | 494,824 | 517,017 | down 4.3% |
| Special Paper Board Stock | 540,565 | 535,194 | up 1.0% |
| Cardboard | 56,629 | 47,362 | up 19.6% |
| *Paperboard Total* | *6,819,357* | *7,083,361* | *down 3.9%* |
| *Construction Paper & Board* | *1,413,137* | *1,412,400* | *up 0.1%* |
| *Wet Machine Board* | *72,452* | *76,507* | *down 5.3%* |
| *All Grades Total* | *14,974,380* | *15,530,321* | *down 3.6%* |

## EXPANSION

**Dyestuffs:** Geigy Chemical Co.'s Dyestuffs Division is taking construction bids for a 50,000-sq. ft. customer-service plant to be built near Charlotte, N.C. Geigy's plans call for the plant to contain offices, a warehouse, and a dyestuff application laboratory.

•

**Industrial Chemicals, Oils:** E. F. Houghton & Co. (Philadelphia) has purchased a five-acre industrial site in Carrollton, Ga. Buildings there will be modernized, expanded, and equipped for production of industrial oils and chemicals for the textile, paper, and metal processing industries.

•

**Paint:** Sherwin-Williams Co. of Canada is launching a "multimillion dollar" expansion program in Western Canada: First stage: a $750,000 distribution center at St. James, Manitoba, due for completion by Feb. '59.

•

**Cement:** St. Lawrence Cement Co., a Swiss firm, plans to build a $35-million, 6-million-bbls./day cement plant in Michigan. A Chicago producer, Marquette Cement Mfg. Co., has strongly opposed the plan on the ground that the industry is already suffering from overcapacity. St. Lawrence denies plans to undercut American prices but concedes that part of the plant's output will have to be sold outside of its local area.

## COMPANIES

**Du Pont** has exercised its option (*CW Business Newsletter, April 19*) to buy the idle sulfuric acid plant of Cornwell Chemical Corp. (Cornwell Heights, Pa.). It will become part of Du Pont's Grasselli Chemicals Dept. Startup is planned for the end of the year, after some equipment modfication.

•

**Vitro Corp. of America's** sale of its Wyoming uranium operations to Susquehanna Corp (Chicago) seems certain to go through, despite the objections of a minority group of Susquehanna directors. The majority are anxious to push the deal through early enough to bid for AEC permits, due to be awarded soon. Stockholders will vote within the next two months. Susquehanna will acquire all the capital stock of Vitro Minerals, which Vitro Corp owns "50-50" with Rochester & Pittsburgh Coal Co. (Indiana, Pa.), (*CW Business Newsletter, Aug. 30*). Vitro Minerals owns more than 310 uranium mining claims near Riverton, Wyo. Susquehanna will, in turn, give each parent company 150,000 shares of capital stock (market value about $2 million). After the holdings yield Susquehanna at least $3 million in profits, the company will pay additional shares; aggregate paid is not to exceed $8 million. (Susquehanna has 1 million shares outstanding, 2 million authorized.) Susquehanna will combine Vitro Minerals' mining operations with those of its subsidiary, Fremont Minerals, Inc., which is building a 550-ton/day uranium mill and a sulfuric acid plant at Riverton. Under a proposed agreement with the AEC, Fremont plans to expand the mill to handle the new ore.

•

**Flintkote Co.** (New York) plans to extend its container operations to the East by acquiring Hankins Container (Cleveland). Hankins operates several plants along the East Coast. If stockholders approve (they will probably vote next month), Flintkote will exchange about 1.24 shares of common stock for each of the 267,458 shares of Hankins' outstanding capital stock.

•

**Foote Mineral Co.** plans to spend up to $2.8 million for capital expenditures this year, perhaps more in '59. Over the past three years the company has liquidated $4.7 million in bank loans and retired a small preferred stock issue.

•

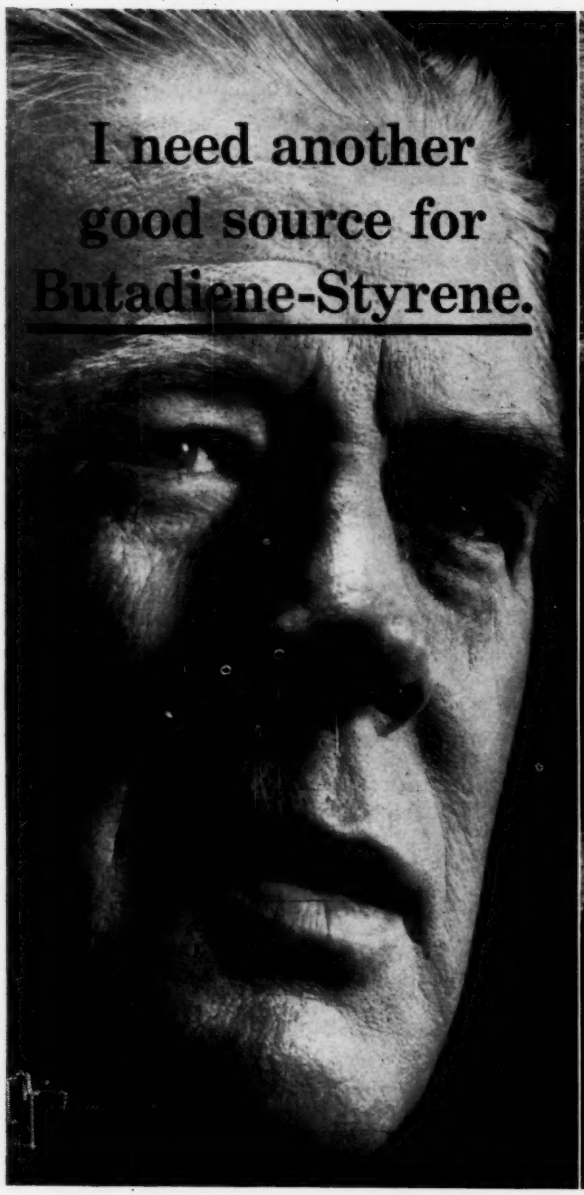
**Chemetron Corp.** is drawing operation of its four Colorado industrial and medical gas plants and regional direct sales activities into its National Cylinder Gas Division. They have been part of the Denver Oxygen Supply Co., subsidiary which Chemetron acquired in '56. Included are oxygen and acetylene plants in Denver, an oxygen plant at Pueblo, and a hydrogen plant in Louisville, Colo. Retail sales branches in Colorado, Wyoming, and Nebraska will still operate under the Denver Oxygen name. As part of the integration, a Rocky Mountain region was set up within the NCG division.

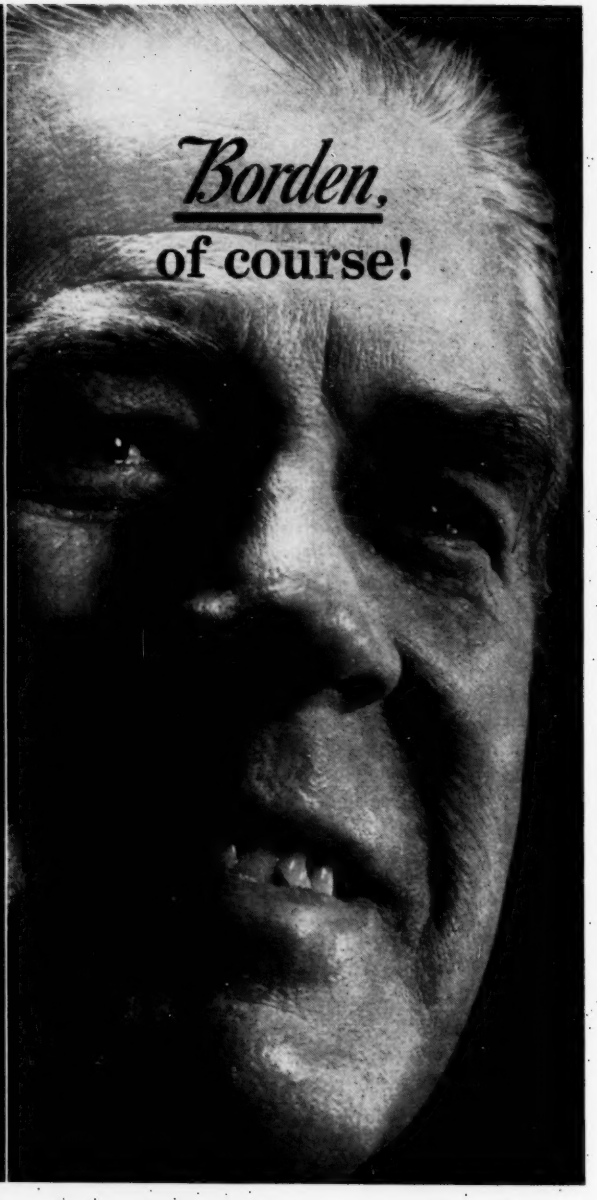
## FOREIGN

**Color Film/England:** Imperial Chemicals Industries plans to enter the international market for retail color film by joining forces with Ilford Ltd., one of England's two largest film producers. ICI will provide processes and raw materials for its "Icicolor" negative-positive film, which it has been marketing as sheet film to professional photographers since last year. Ilford will manufacture the film and market it through its worldwide outlets (which include a U. S. subsidiary). Over a five-year period, ICI plans to acquire one-third ownership of Ilford and undertake color photography research for Ilford under a long-term contract. The deal awaits approval by Ilford stockholders and the government.

•

**Chemicals/Chile:** A new plant to produce glacial acetic acid, ethyl, butyl, and amyl acetates has been built in Vina del Mar, Chile. Initial capacity is 600 metric tons/year. Operating the plant is Oxiquim Ltda., a new firm owned "50-50" by Farmo-Quimica del Pacifico S. A. and Sintex Ltda. The company plans to produce solvents, insecticides and dyestuffs eventually; these now must be imported, either as finished products or in the form of intermediates.

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# Washington Newsletter

CHEMICAL WEEK
September 6, 1958

**The new textile-fiber products identification act** is identical in purpose to previously enacted laws—e.g., the wool products labeling act and the fur products labeling act—and will be enforced by the same government agency, the Federal Trade Commission.

It will require manufacturers and retailers to attach informative labels to textile products, to tell consumers the true fiber content of what they buy.

The law becomes effective 18 months after Eisenhower signs it. But in nine months, FTC will issue a set of regulations, spelling out the rules of the road. Among items already exempted from coverage are such textile products as inner linings, gloves, sewing thread and bandages. Other provisions: ban use of names of fur-bearing animals to describe textiles having no fur-fiber content; require identification of the country where any imported textile product was processed or manufactured.

•

**The oil import base is being broadened.** A new plan in the works would permit any domestic oil company with an operating refinery to bring in a share of foreign oil—probably about 12% of its refinery runs. The voluntary quota system heretofore had excluded all but long-established importers, plus a relative handful of newcomers. The new plan would apply only to the area east of the Rocky Mountains, excludes the Pacific Coast.

It will mean heavier imports. The existing program's goal is to restrict crude imports to 713,000 bbl./day. That figure probably will rise to about 750,000 bbl. Note: only unfinished oils are covered. Imports of gasoline, kerosene, distillates, etc., may continue without restriction.

•

**Patent legislation was stalled entirely** in the now-departed 85th Congress. Sen. Joseph C. O'Mahoney's (D., Wyo.) subcommittee on patents, trademarks and copyrights continues to issue scholarly reports on the system, but if it has made any impact on Congress it is not immediately discernible. In fact, O'Mahoney didn't even hold hearings on a bundle of his own bills. And the perennial effort to increase patent fees didn't even get out of a House committee.

All legislation has to be reintroduced, to start anew through the legislative gamut next January. At that time, you'll be hearing more about higher patent fees, as well as most of O'Mahoney's own proposals. Among these:

Creation of a single court of patent appeals; putting a shorter life on a patent's effectiveness; and reduction of the practice of "defensive" patenting—i.e., obtaining a patent not for commercial use but as a pre-

## Washington Newsletter

(Continued)

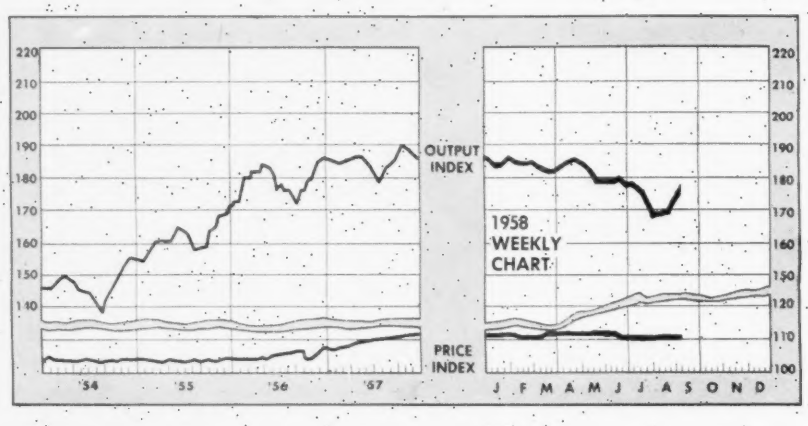
caution against another inventor's getting rights to the same invention. Unless something changes remarkably in the over-all legislative approach, however, none of these measures is likely to get very far in the upcoming 86th Congress, either.

•

**Congress cut back on funds for the new space agency** almost as soon as it brought it into being. The national Aeronautics and Space Administration—and its new head, Keith Glennan,—are charged with putting our lagging space program ahead of the Russians'. But NASA is going to get $45 million less than it thinks it needs for maximum growth in the year ahead.

A total of $20 million was cut from NASA's request for research and development, $22.8 million from its construction program, and $2 million from its budget for salaries.

This leaves NASA with about $80 million instead of $125 million. Officials had anticipated that Congress would vote them more than the Eisenhower Administration requested—as was done in the case of the Pentagon's program for missiles and other new weapons. But NASA will benefit from some $11.7 million to be transferred from the Defense Department's own advanced research projects agency, and about $100 million it inherits from its predecessor agency, the National Advisory Committee for Aeronautics.




# Business Indicators

| WEEKLY | Latest Week | Preceding Week | Year Ago |
|---|---|---|---|
| **Chemical Week** output index (1947-49=100) | 178.0 | 175.0 | 181.5 |
| **Chemical Week** wholesale price index (1947=100) | 110.7 | 110.7 | 110.9 |
| Stock price index of 11 Chemical Companies (Standard & Poor's Corp.) | 44.47 | 43.47 | 42.53 |

| MONTHLY Trade (million dollars) | Exports Latest Month | Exports Preceding Month | Exports Year Ago | Imports Latest Month | Imports Preceding Month | Imports Year Ago |
|---|---|---|---|---|---|---|
| Chemicals, total | 127.9 | 114.2 | 134.1 | 24.4 | 25.0 | 24.7 |
| Coal tar products | 8.1 | 9.2 | 10.2 | 6.5 | 3.6 | 5.5 |
| Industrial chemicals | 20.6 | 18.1 | 21.7 | 7.2 | 7.3 | 7.6 |

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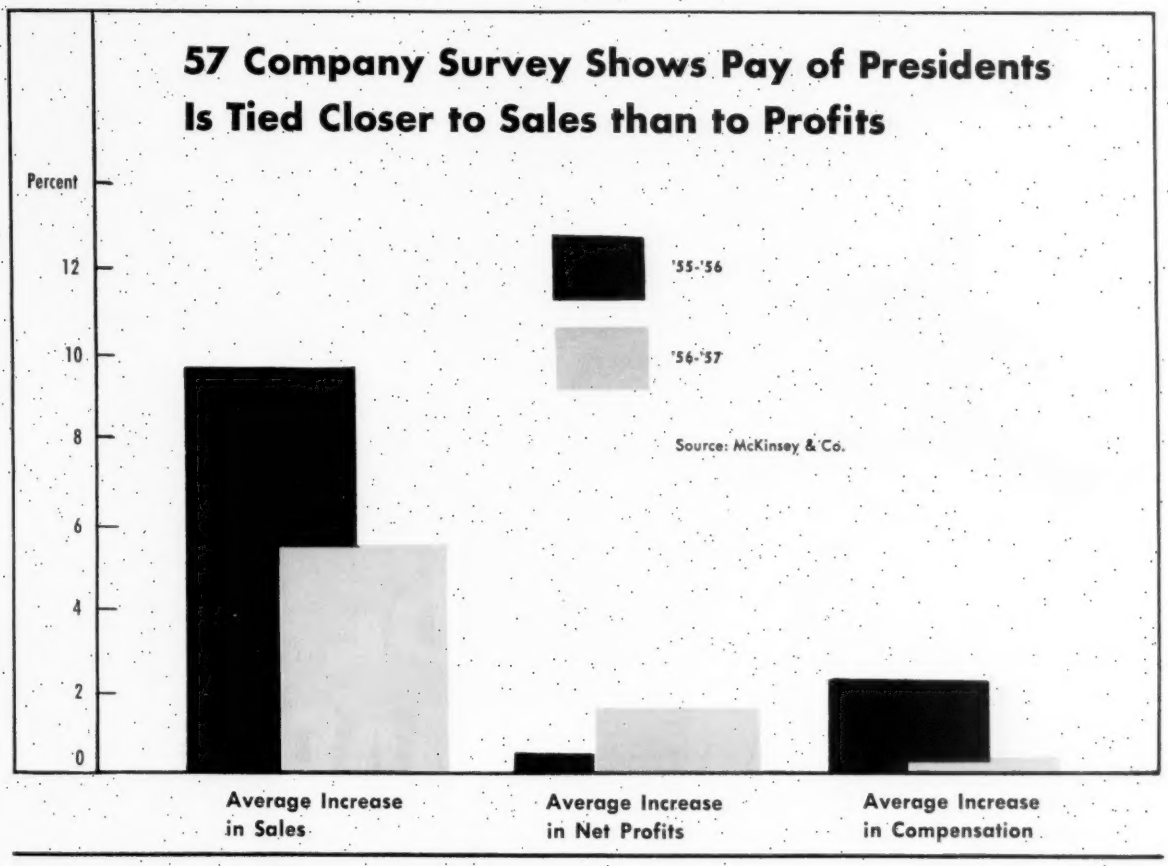



# Sales Downtrend Cuts Executive Pay Hikes

**Pay increases for chief executives of 57 leading chemical companies were fewer and farther between in '57 than in '56, a survey conducted by McKinsey & Co., management consultants, indicates this week.**

The survey also shows that increases in the pay of chief executives depend more on changes in a company's sales than on variations in net profits. While the net profit of the firms included in the survey showed a sharp improvement in '57 over '56, as compared to '56 over '55, the sales-increase comparison was not as favorable (*chart*). And top-executive compensation followed the sales trend.

Last year, chief executives got an average compensation increase of 0.2%, while in the previous year, the increase amounted to 2.4%. Chemical executives trailed their confreres in 17 other major industries, who received increases averaging 1.0%, for '57. The latter, however, were down considerably from the 5.1% increase for '56 (*CW, Sept. 7, '57, p. 47*).

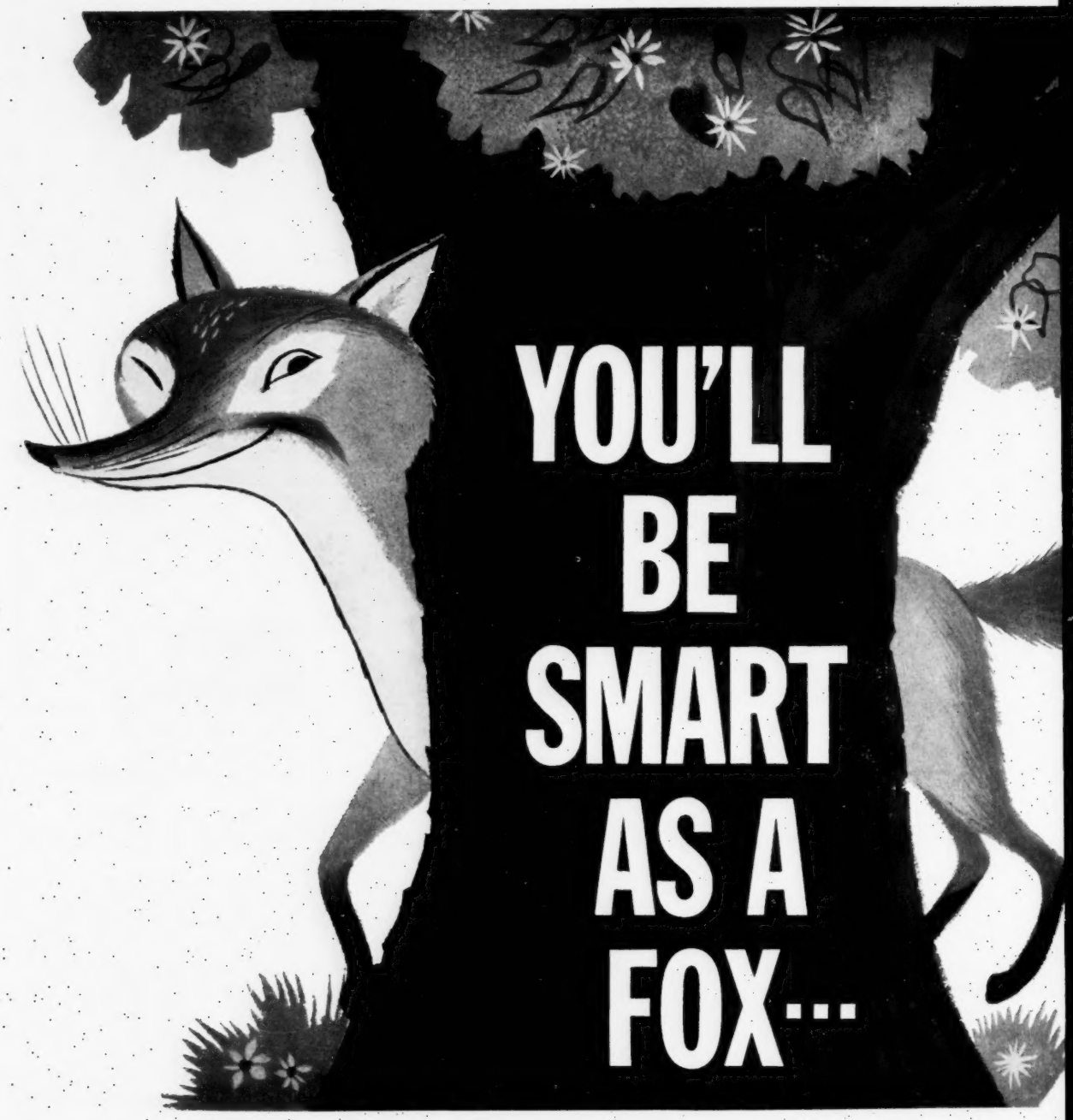
McKinsey's Richard Grieb made the survey of 642 companies' reports to the U.S. Securities & Exchange Commission. The 57 chemical companies represent about $11 billion in sales, or half of the total $22 billion in sales reported by Standard & Poors for the chemical industry.

For five chemical process industries (nonferrous metals, paper, petroleum and natural gas, rubber, and chemicals) combined average sales increases amounted to 5.7% last year, with a profit decrease of 5%, while increases in compensation to chief executives was 2.4%. Much of the profit decrease is attributable to the nonferrous metals industry, whose profits dwindled 32.7% in 1957.

Though chemical chief executives lagged behind those in other industries in compensation increases, a greater proportion of them received pay hikes, compared to all industry. Where, in industry in general, 39% of top executives got increases, 35% had salaries remain the same and 26% took decreases, 39% of chemical presidents got increases, 30% were the same and 27% were down. Smaller chemical firms' presidents did better, comparatively (*table*), than their counterparts in larger companies.

Second-, third-, and fourth-line chemical executives can take heart from their positions relative to the boss. Taking the boss' salary as 100%, second-line men received an average of 72% of presidents' pay, third-line men 61%, and fourth-line men 57%. This was better than the averages for all industries—69%, 57% and 52%.

**Methods of Paying:** Methods

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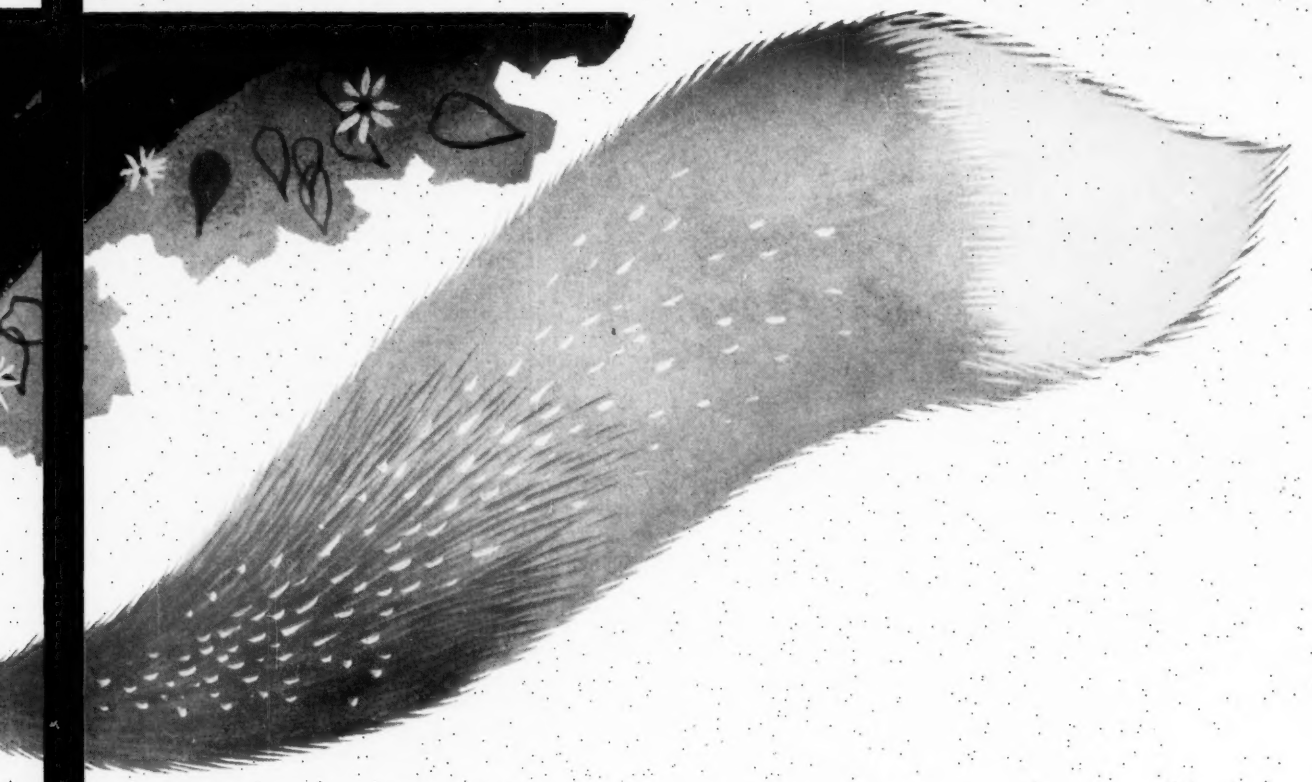

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- ★ *Refined Fusel Oil*

through which chief executives are compensated vary widely. In the all-industries group about 33% of the companies had deferred compensation plans compared to only 12% in the chemical industry. About 60% of all companies covered had stock option plans while eight percent of the chemical companies included them as part of total compensation. Ninety percent of all the companies had pension plans compared to 93% for the chemical groups. Profit-sharing trusts were included by 11% of the all-industries groups compared to 10% of the chemical industries group.

## Powder Strike Ended

**The strikebound** employees of American Cyanamid's Grafton, Ill., powder plant have voted 35-31 to end their five-month strike and return to work under a contract virtually the same—minus pension plan—as that originally proposed by the company prior to the strike. The employees, members of International Chemical Workers Union Local 17, went out on February 28, 1958, in protest against a Cyanamid proposal that drastically altered terms under which they had worked for the plant's previous owner, Illinois Powder Co.

Biggest item of contention was discontinuation of the union shop, and replacement with a "maintenance of membership union security" clause under which employees voluntarily joining the union must remain in it until termination of the agreement. The union finally accepted this, as well as a 5¢/hour wage increase, also offered before the strike began.

Union spokesmen expressed disappointment at the settlement, saying, "We can't claim a victory." They said the events at Grafton would be studied as a case-history at the union's convention in September. The study will be made during a conference of company-wide bargaining units designed to discuss means of bolstering offensive apparatus in company-wide bargaining.

The one-year contract includes a company insurance plan, but no pension plan. Cyanamid had offered to include a pension plan if the union would accept a two-year contract.

The strike was highlighted by a company-wide protest, but only a minimal number of employees participated.

**Amoco Chemicals**

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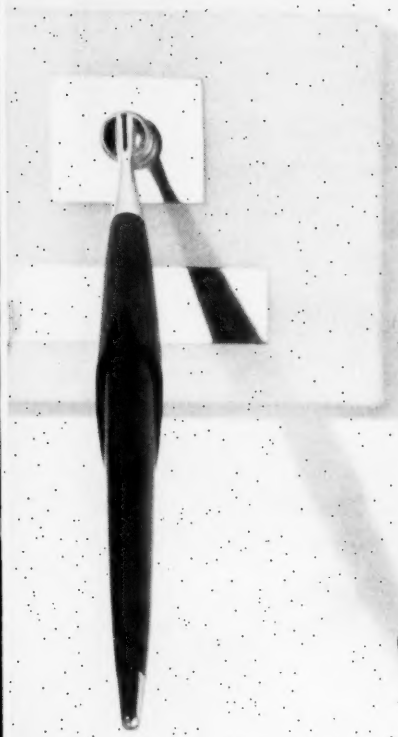
**introduces**

# Trimellitic Anhydride

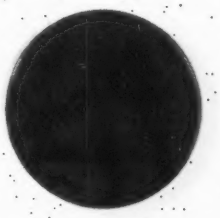
**available in**

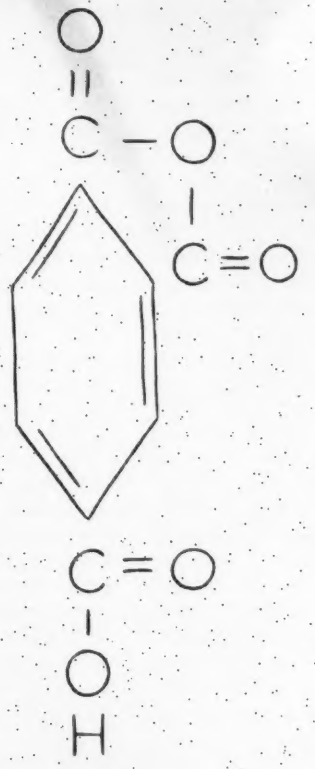
**development quantities**



Amoco Chemicals is now offering literature and laboratory samples of Trimellitic Anhydride. This tri-functional compound is the first extension of Amoco's unique direct oxidation process. Evaluate Amoco Trimellitic in applications where aromatic dibasic acids are now used. Consider the opportunity it presents to synthesize many new resins and intermediates.

Write for a sample and additional information.



AMOCO CHEMICALS

AMOCO CHEMICALS CORPORATION
Development Department
910 South Michigan Avenue, Chicago 80, Illinois

**Hinton's population boomed to 7,500 overnight, the result of . . .**

# New Industry in Small Town

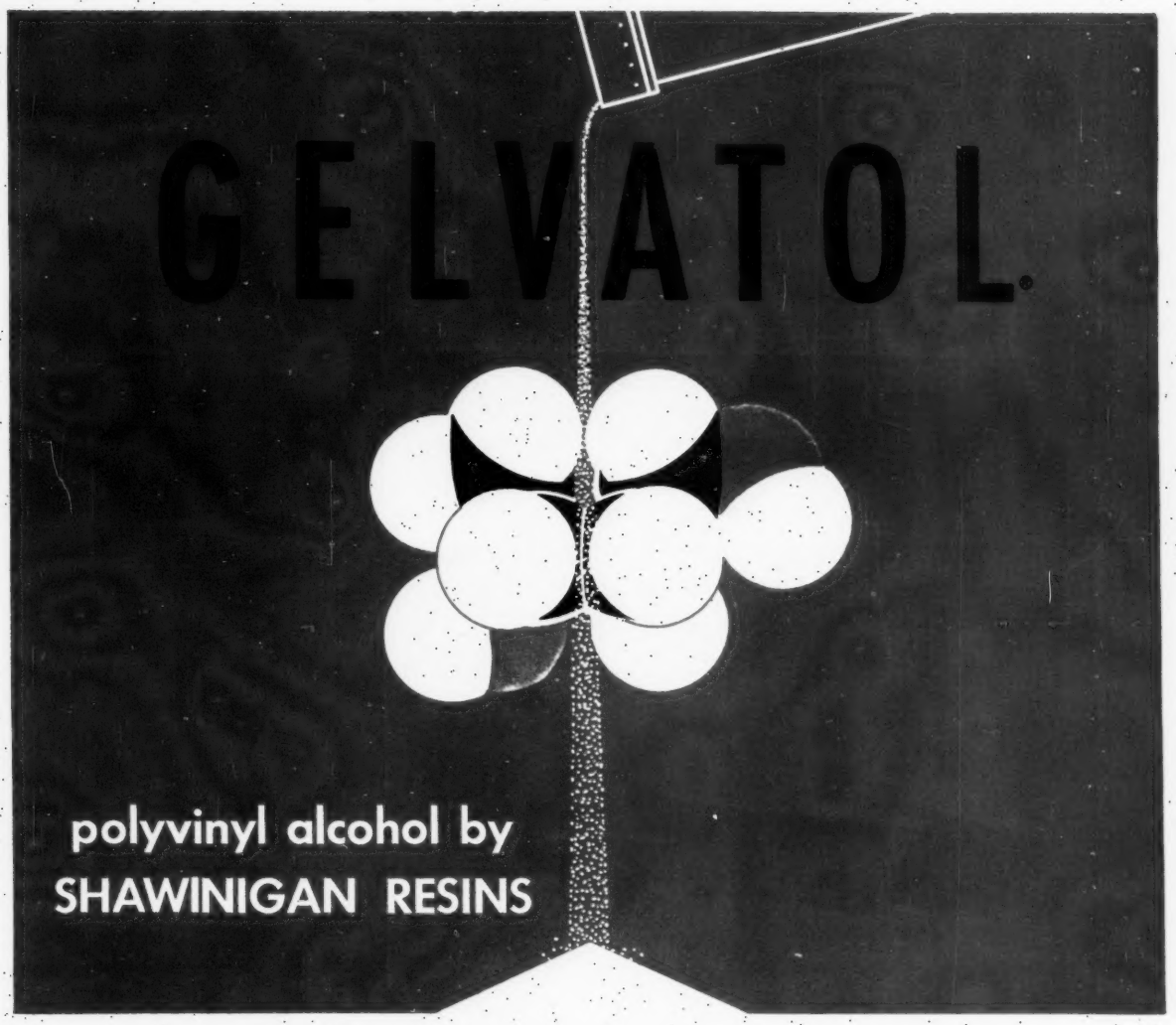
**Process industry executives who think company towns are a thing of the past got new support from a just-released survey—a survey on the growth of a town built up in a remote Alberta prairie when a new pulp mill was erected.**

When Hinton, Alberta, was selected as the site for North Western Pulp and Power Ltd.'s $42 million pulp mill (a joint venture with St. Regis Paper Co.), the town had a population of 200, its economy was based on small-scale ranching, farming and trapping. When the 430-ton/day mill began production in April, '57, the town's population had reached 3,000; it's now estimated at 7,500.

**Open Town Planned:** In planning creation of a new Hinton, company management and provincial officials agreed to make it an "open" rather than a company town. Their reasoning: the number of employees needed would be significant enough to make worthwhile substantial investments by outside firms—realtors, retail industry, services and the like—that otherwise would have to be made by the company.

So far, while North Western has spent $60 million on its plant and facilities, it has encouraged the expenditure of several millions more by noncompany-related private capital. The latter includes erection of $2.8 million worth of homes, a $500,000 school and a $1 million hotel by Athabaska Valley Corp. In addition, Hudson's Bay Co. has invested $250,000 in a department store.

The just-released survey—unique in that it registers the company's impact on a small community not affected by other industries, not serving a farm area and quite removed from a large city—reveals these significant facts: annual payroll to mill employees is $2.5 million, retail sales in the town are expected to exceed $3 million this year, tax receipts by the town totaled $376,000 last year (an in-

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These are important advantages:

1. Particle size that minimizes dusting.
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3. Notable uniformity from bag to bag, lot to lot.
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**SHAWINIGAN RESINS**

crease from the $41,000 received in '54), tax assessment increased by $10 million, and there are now two hotels, three banks, two department and five clothing stores, four drug and three hardware stores, three barber shops, seven service stations, two jewelry stores and two theaters, 500 new homes, 11 apartment buildings and 75 new businesses in the booming community. In addition, a $400,000, 25-bed hospital has been proposed and a $125,000 civic center is under construction.

And even now as annual pulp shipments are valued at $25 million (90% of which is exported to the U.S. as a duty-free raw material), North Western management is planning the first capacity increase on the way toward a reported ultimate of 900 tons/day.

## KEY CHANGES

**Thomas L. Perkins** to board chairman, American Cyanamid Co. (New York).

**William R. Kelly, Jr.,** to vice-president sales, Winchester-Western Division, and **Derek Richardson** to vice-president aluminum sales, Metals Division, Olin Mathieson Chemical Corp. (New York).

**Ralph H. Martin** to vice-president Dixon Chemical & Research, Inc. and Dixon Chemical Industries, Inc., an affiliate, (Bloomfield, N.J.).

**Roger V. Loutz** to president, Cutter Laboratories Overseas Corp., and **Ralph J. Richardson** to general sales manager, Cutter Laboratories (Berkeley, Calif.).

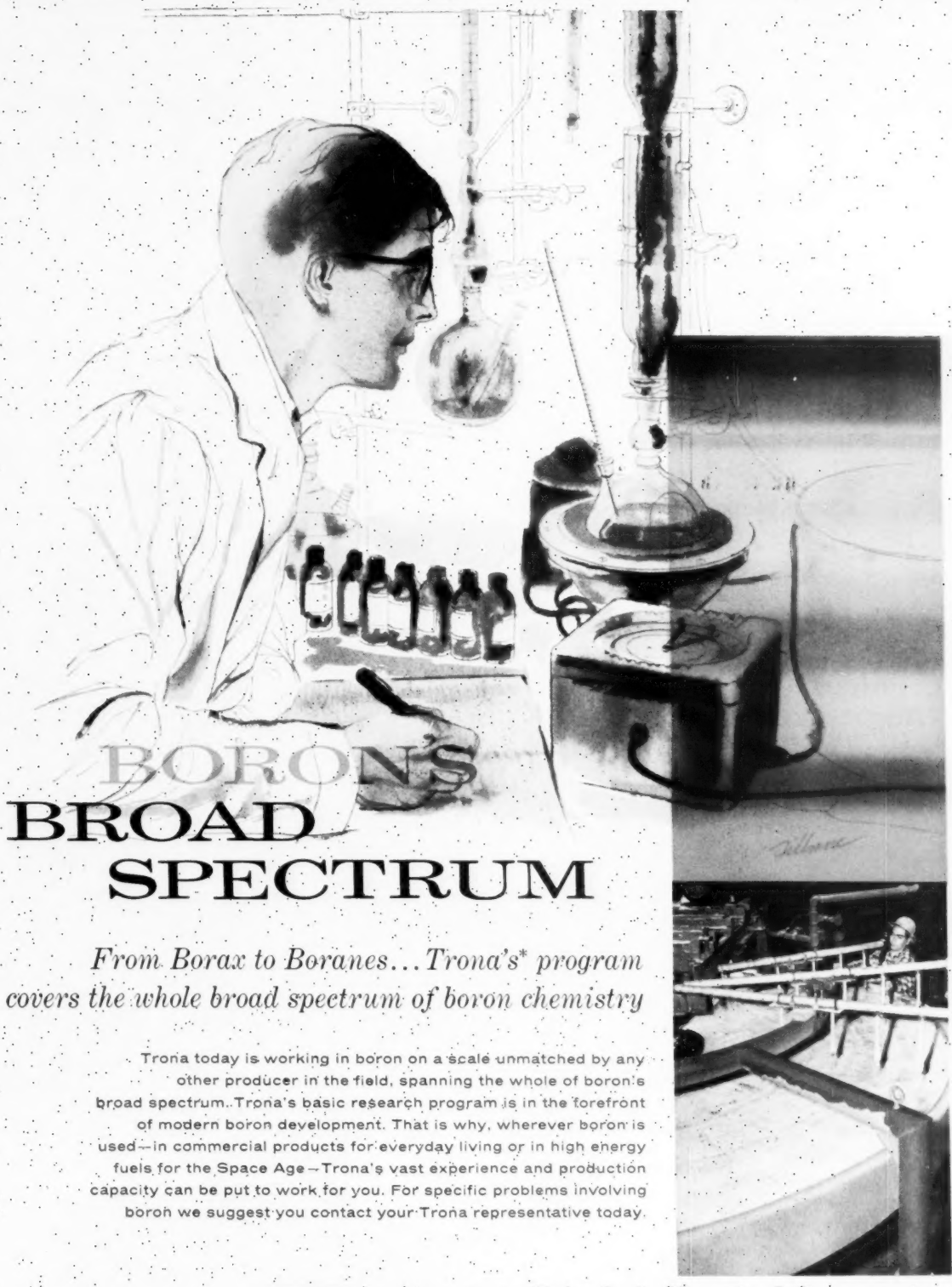
**George F. Polzer** to executive vice-president and director, Ultra Chemical Works, Inc., division of Witco Chemical Co., Inc. (New York).

**Malcolm T. Murray** to vice-president specialty products sales, Brown Co. (Berlin, N.H.).

**John M. Keene, Jr.,** to vice-president and assistant sales manager, Kennecott Sales Corp., subsidiary of Kennecott Copper Corp. (New York).

**Russell D. Richardson** to vice-president finance, Tidewater Oil Co. (San Francisco).

**William H. McConnell** to vice-president marketing, **Henry B. Clark** to director of sales, and **Samuel S. Savage** to general manager, newly established International Division, Diamond Alkali Co. (Cleveland).



# BORON'S BROAD SPECTRUM

*From Borax to Boranes... Trona's* program covers the whole broad spectrum of boron chemistry*

Trona today is working in boron on a scale unmatched by any other producer in the field, spanning the whole of boron's broad spectrum. Trona's basic research program is in the forefront of modern boron development. That is why, wherever boron is used—in commercial products for everyday living or in high energy fuels for the Space Age—Trona's vast experience and production capacity can be put to work for you. For specific problems involving boron we suggest you contact your Trona representative today.

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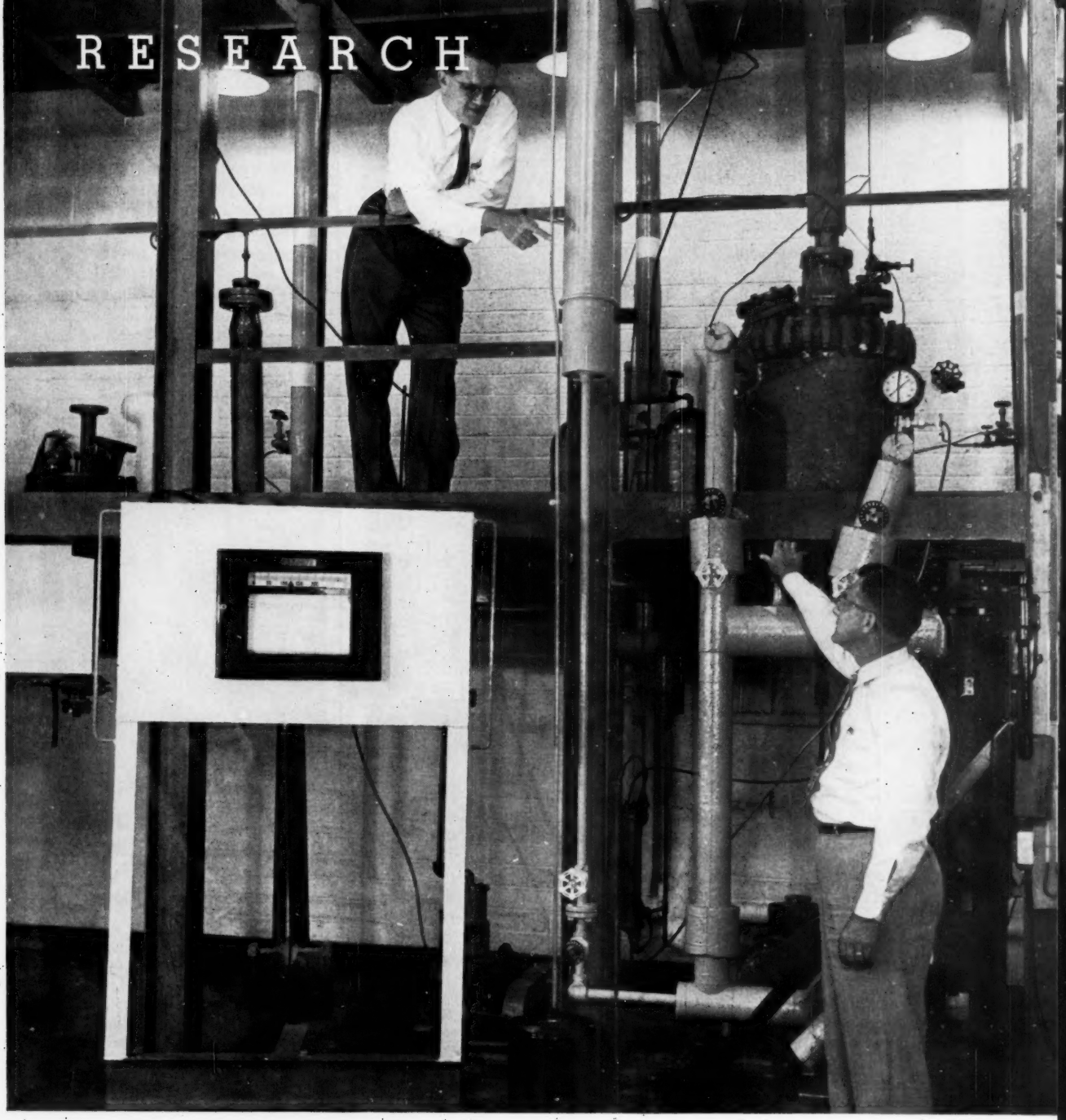
**SALES OFFICES: Eastman Chemical Products, Inc.,** Kingsport, Tennessee; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston. **West Coast: Wilson Meyer Co.,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.



At Neville Chemical's pilot plant, pure, nonpolymerized indene is readied for a new reactive role.

# Promoting Indene from the Pilot-Plant Class

**At its pilot plant on Neville Island (Pittsburgh, Pa.), this week, Neville Chemical Co. is turning out the country's first commercial indene—a high-purity (98%) product that's bent on a brand-new chemical career in drugs, plastics and other products.**

Known for about 70 years, indene has also been available for a long time in polymerized form in coumarone-indene resins sold by Neville, Pennsylvania Industrial Chemical Co. (Clairton, Pa.) and others. But it hasn't been offered as an independent product because of the high cost of isolating it from the coal-tar or cracked petroleum fractions in which limited amounts are found.

Coumarone and indene are commercially polymerized by treating coal-tar fraction containing both com-

pounds with a catalyst, then separating the polymer from catalyst and volatiles.

Now, as a result of a process Neville won't disclose (patents have been applied for), indene is emerging as a potentially valuable commercial chemical. It won't be used in coumarone-indene resins, however, since their price (about 15¢/lb.) won't justify indene's $1-1.50/lb. (in quantities up to a drum) initial cost.

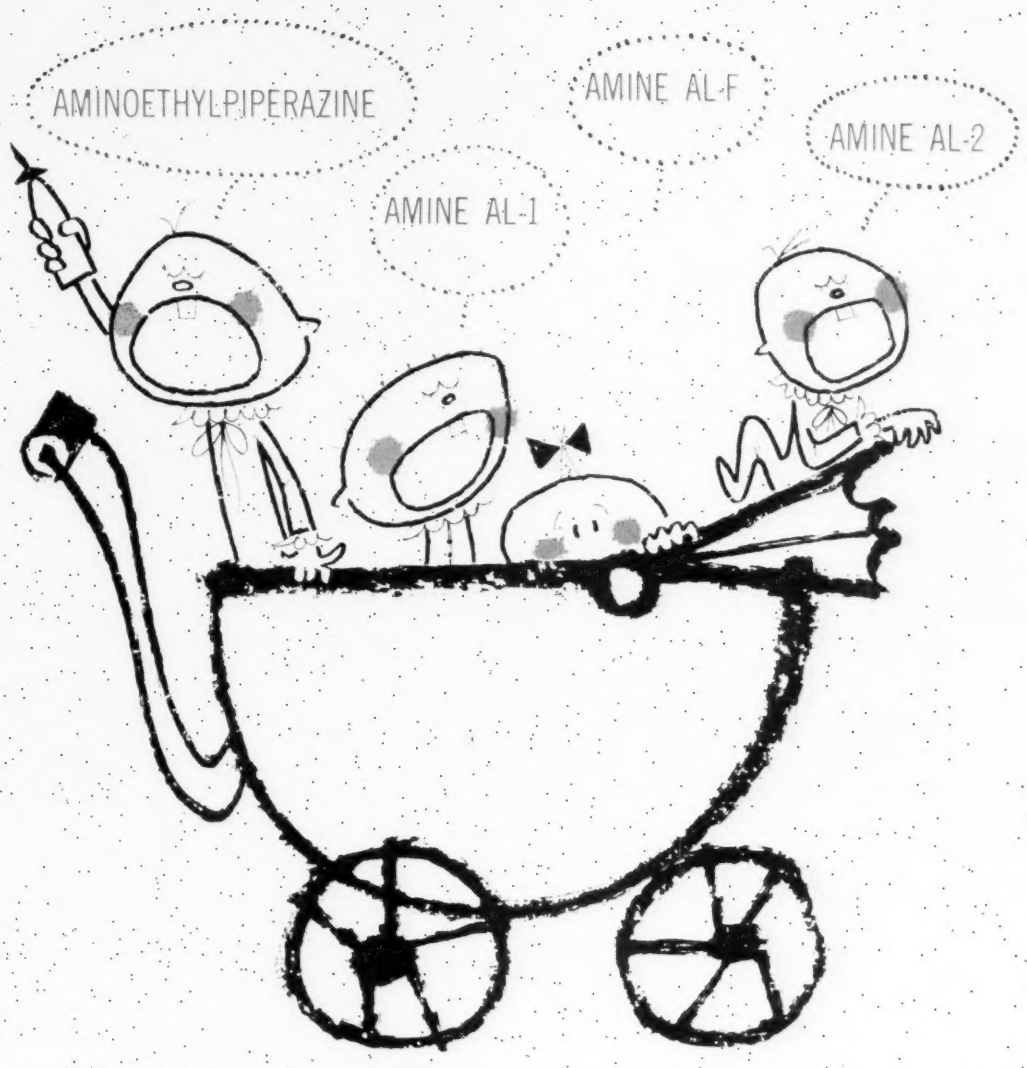
According to John Freeman, Neville's Technical Director, the firm is staking the product's future on the fact that it has two reactive centers —the double bond and the methylene group of the molecule's five-membered ring—and therefore a wide potential as an intermediate and reactive monomer. There's a chance, Freeman believes, that indene-butadiene rubbers may be developed. Feature: properties superior to those of styrene-butadiene. For making polyester fibers, homophthalic acid prepared by oxidation of indene might challenge terephthalic or isophthalic acid. And there are a spate of other possibilities.

Neville's Freeman sees a bright future for indene in drugmaking.

Esters of 1-indanol are reported to be plasticizers. Addition of chlorine to the indene double bond yields a product reported as an insecticide (Austrian patent 165,098).

In the drug field, Indene's commercial future looks particularly bright. Indene derivatives are being tested as bronchodilators, antihistamines, local anesthetics and antiseptics.

It may be at least a year, how-




# 4 NEW ARRIVALS...with a bright future!

***Look at it this way...***

*You'll find Jefferson an excellent source of these economical liquid polyamines...*

AMINOETHYLPIPERAZINE—a high-boiling triamine combining a primary, a secondary, and a tertiary amine group in a single molecule.

AMINE AL-1—an economical mixture of heterocyclic and aliphatic polyamines of high nitrogen content.

AMINE AL-F—a distilled product of clear, amber color very similar in composition to Amine AL-1.

AMINE AL-2—a light-colored, distilled mixture of primarily heterocyclic polyamines containing about 60-65 per cent aminoethylpiperazine.

**We have found some very interesting applications for these Polyamines**

Epoxy curing agents—these polyamines, containing the piperazine nucleus, impart good flexibility and high impact strength to the resin; excellent castings, laminates, and surface coatings are obtained.

**And their Derivatives**

Corrosion inhibitors — Asphalt anti-stripping agents — Surfactants — Emulsion breakers —

**What uses can you find for them?**

These polyamines are available from Jefferson in 55-gallon drums and tank cars. Technical bulletins and samples are available upon request. **Jefferson Chemical Company, Inc., 1121 Walker Avenue, Houston 2, Texas.**

**JEFFERSON CHEMICAL COMPANY, INC.**

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Ethylene Oxide, Glycols, Dichloride • Ethanolamines • Morpholine • Piperazine • Polyethylene Glycols • Nonyl Phenol • Surfonic® Surface-Active Agents • Ethylene Carbonate and Propylene Carbonate • Caustic Potash • Caustic Soda • Soda Ash • Sodium Bicarbonate

*Essential Chemicals From Hydrocarbon Sources*

## RESEARCH

ever, until the first firm use of the new synthetic indene shows up, Neville believes. But the company anticipates no problem at any time in scaling up its process in a hurry.

## EXPANSION

• General Electric Co. (Schenectady, N.Y.) has started construction on its new $1-million radiochemistry research building at the Hanford, Wash., atomic plant. For advanced research, the lab will handle high level radiation work (up to 1 million curies). On the East coast, GE has just completed its $1.3 million silicone products laboratory (Albany, N.Y.).

• Washington Iron Works (Seattle) will establish a wood products research laboratory this fall in conjunction with Hill & Ingeman, consulting engineers. The new lab will act as an independent lab, concerned particularly with wood pulping problems.

## APPARATUS

**Liquid Nitrogen Refrigerator:** Linde Co., a division of Union Carbide Corp. (New York), has developed a liquid nitrogen refrigerator which will maintain a temperature of —320 F. Features include: portability (it weighs only 11 lbs.), storage capacity of 392 cu. in.

•

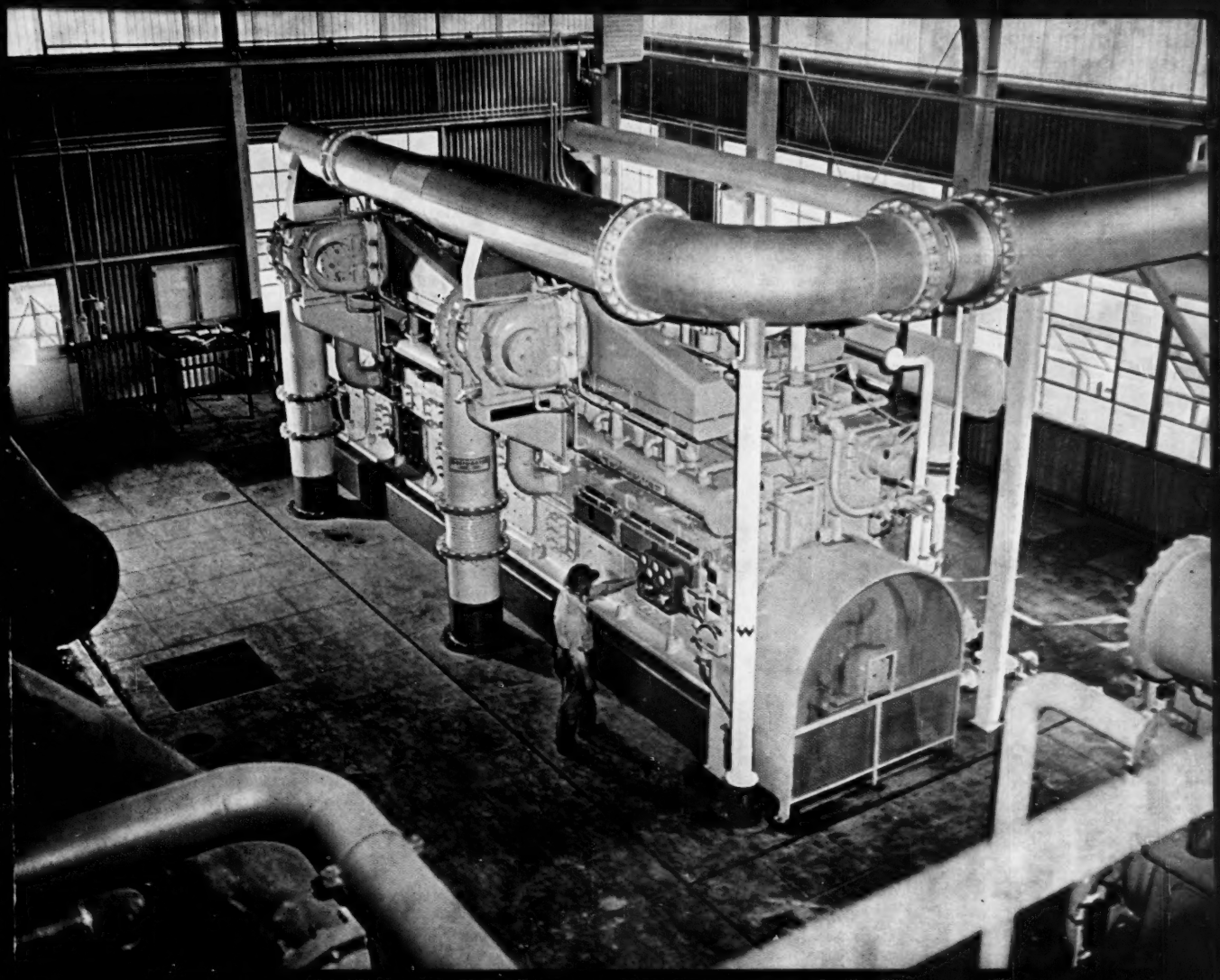
**Hot Fluid:** Burettes which will deliver heated liquids in small quantities have been developed by Pressure Products Industries Inc. (Hatboro, Pa.). Called Thermettes, they will maintain liquids at temperatures up to 350 F.

•

**Pathogen Sampler:** The Anderson Sampler developed by the U.S. Army Chemical Corps is a new device to collect and identify airborne pathogens, and separate them automatically into size categories. It reportedly will detect and classify particles which all-glass impinger equipment cannot. Suggested use: In air sampling for bacteriological studies.

## PRODUCT

**Chlorinated Xylenes:** Diamond Alkali Co. (Cleveland) has three new chlorinated xylenes: terephthaloyl chloride, γ, γ'-hexachloro-m-xylene and isophthaloyl chloride. Suggested uses: as intermediates in fibers, films.



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# SUTC

## THE ONLY 2-CYCLE ENGINE COMPRESSOR WITH SELF-SUSTAINED TURBOCHARGING!

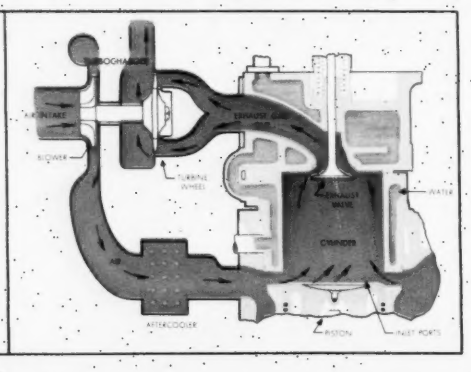
TURN PAGE FOR DETAILS

# WORTHINGTON'S SUTC

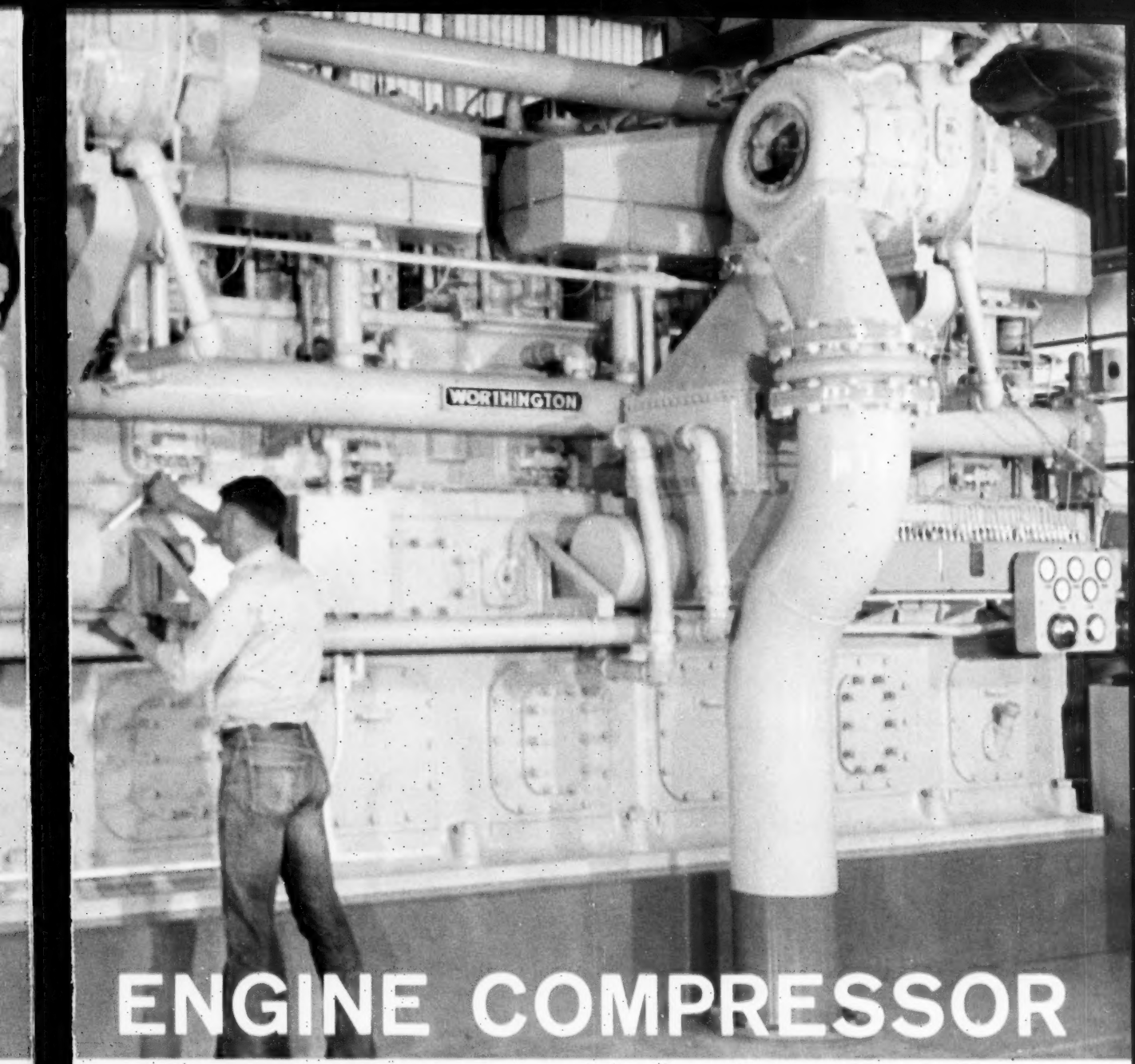
# Easier starting, quicker loading,

**TURBO-UNIFLO OPERATION**

Straight through flow of air in the cylinder, the large inlet port areas (full 360 degrees), and the timed exhaust valves give maximum scavenging effectiveness with optimum back pressure.




Compact, reliable, efficient—the unique SUTC gas engine compressor with independent turbocharging has quickly become the outstanding engine compressor on the market. (Today, SUTC engines are in operation in chemical, petro-chemical plants and in pipeline service throughout the world!) Thanks to the self-sustained turbocharging feature the SUTC develops almost double the hp in the same space required by a non-turbocharged engine. Further, the field-proved Worthington TURBO-




# ENGINE COMPRESSOR

## most flexible in operation

UNIFLO system provides the most complete scavenging, resulting in a complete absence of residual gases in the combustion chamber.

**Power**.—The SUTC integrates exhaust-powered turbocharging with field-proved Uniflo scavenging design for unequalled stability of performance over the complete range of speed and load requirements. The SUTC range: 1250 to 2500 hp. Supplied in 5, 6, 7, 8 and 10 cylinder in-line units.

**Economy**—No engine compressor in this range is more economical. Low fuel consumption stems from the fact that sufficient exhaust gas energy is applied to give full turbocharged effect through *all* speeds and loads without added mechanical means for driving the supercharger.

**Efficiency**.—Operating at relatively high compression ratio, the Turbo-Uniflo design affords much smoother combustion characteristics than other engines with lower compression ratios. This is due to the positively controlled timing arrangement, cylinder configuration and design of the exhaust manifolding.

For complete details on the SUTC turbocharged gas engine compressor, call your nearest Worthington District Office, or write: Worthington Corporation, Section 43-2, Harrison, New Jersey. In Canada: Worthington Canada Ltd., Brantford, Ont.

**WORTHINGTON**

compressor-user survey shows

# FEATHER VALVE PREFERRED 2 TO 1!

FEATHER VALVE

VALVE A

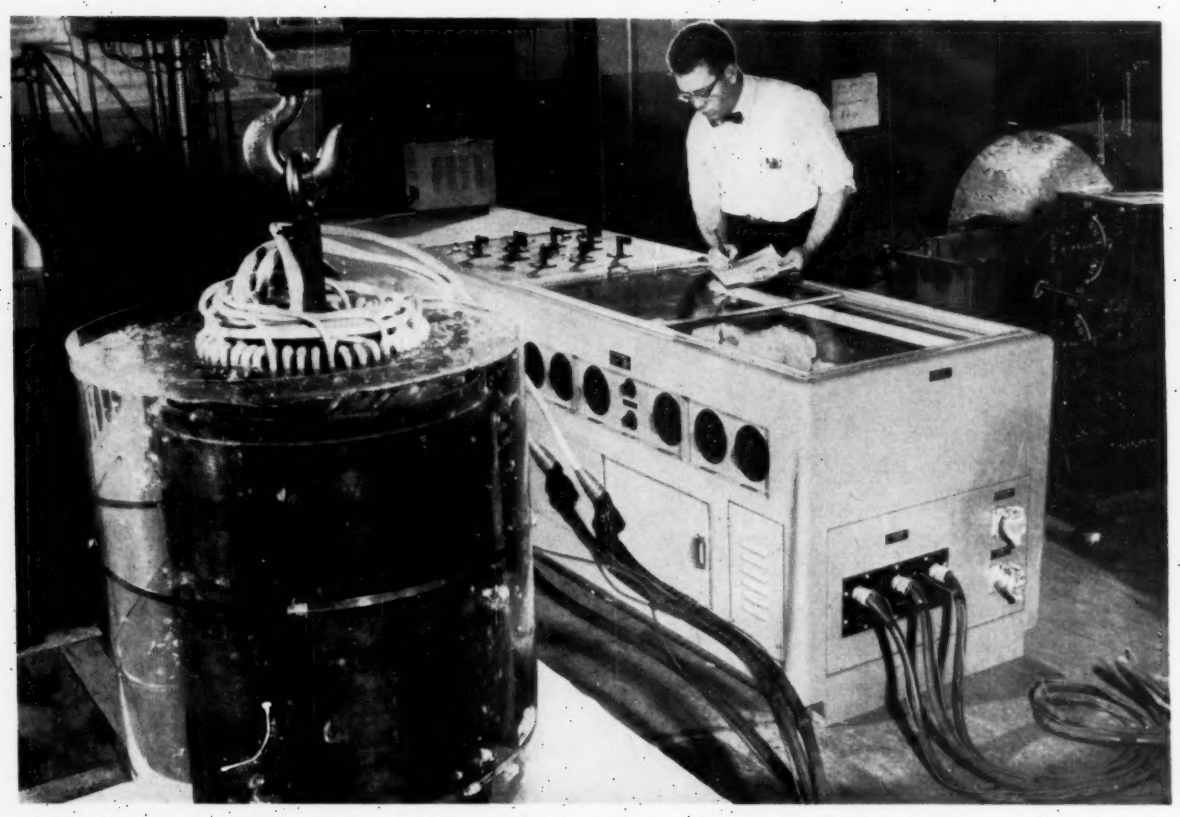
VALVE B

A recent survey of compressor users put the amazing Feather*Valve first by far in all four operating categories —simplicity of construction, efficiency, low maintenance cost and quiet operation. In addition, the Feather Valve was picked as the preferred compressor valve 2 to 1 over the nearest competing type of valve!

The lightest, fastest-acting valve available, the amazing Feather Valve provides very sharp action with virtually no slip or back-flow. It works with no impact . . . has no buffer plates or cushioning devices. Practically indestructible it assures long life with negligible maintenance costs. When buying your next compressor, look into Worthington's complete line of Feather Valve units. Worthington Corporation, Harrison, N. J.

*REG. U. S. PAT. OFF.

**WORTHINGTON**



**GE technician uses water-filled tank to test stator of motor with irradiated polyethylene insulation.**

# "Wet" Motors Tackle Pump Seal Problems

**This week, General Electric is taking the wraps off a new "wet" motor said to be the first immersion motor of its type designed and produced by a U.S. company. And the chemical industry, GE believes, may find it useful in pump drives where seal failure is a major problem—there's less chance of contaminating this kind of motor and, in addition, it may offer lower cost and greater efficiency than pumps with canned motors.**

Key to the motor's operation: an insulation system of irradiated polyethylene that permits windings, bearings and magnetic components to be completely immersed in water.

"Submarine" motors of 250 and 350 HP. are already on trial at over 30 utility power plants, where they are driving water-circulating pumps in high-pressure boiler systems. The water being pumped is allowed to circulate through the wet motor's internal electrical and mechanical components—there is no seal, no chance of seal failure. In a conventionally powered pump, the seal might have to withstand a pressure of 3,000 psi.

Wet motors of 50 HP. are on marine trial in salt water. Mounted on the rudder of a ship, they improve maneuverability at low speeds.

**The Case for Chemicals:** While the motor was designed only for immersion in fresh and salt water at temperatures up to 600 F, it might well operate in various chemical streams, since irradiated polyethylene has good chemical resistance, generally. And although GE emphasizes that it is not calling the motor a "chemical" motor, it is ready to look at specific chemical applications.

Before it will suggest any application for nonwater submersion, GE prefers to study each situation individually. Different liquids may require different bearings and magnetic materials. For example, the motor's use in salt water instead of fresh required a switch from Graphitar (molded carbon-graphite) to rubber bearings, and from silicon to stainless-steel punchings.

And while the irradiated polyethylene insulation is inert to water and water-soluble chemicals (including most acids and alkalis), it can't be used in chlorinated solvents, aromatic hydrocarbons or paraffins. However, the engineers in GE's medium ac. motor and generator department, where the wet motor was developed after more than two years of research, feel that the insulation problem will soon be licked, are developing modified insulation that will withstand the attack of the petroleum-base materials.

**Fitting In:** GE points out that wet

motors are made in Germany and England. The British firm (Hayward Tyler & Co., Ltd.) has licensed U.S. firms producing immersion pumps for deep-well applications. Both polyethylene (not irradiated) and polyvinyl chloride have been used as insulation materials.

GE, however, is not interested in deep-well applications, unless high horsepower motors are required. The firm's lower limit for motor size is about 100 HP. (at about 900 rpm.). Frame size is the limiting factor—GE prefers not to make one smaller than about 15 in.—and although a 50-HP. motor is made for marine use, it is fitted to the larger frame.

The new wet motor may compete with some canned motors. On a volume-production basis, GE figures the wet motor's cost will run about 70% of that of comparable canned motors. (Canned motor cost will depend on type of construction—e.g., stainless steel, carbon steel—of course.)

Furthermore, GE says, wet-motor efficiency is higher—90 or 92%—than the average canned motor efficiency of 82-83%. The canned motor has higher electrical losses because of the air gap in the can between the rotor and stator.

Efficiency of the wet motor and oil-filled types probably runs about the same (windage losses in water and oil would be comparable). But the wet-motor cost will probably be about 10-20% higher than that of oil-filled types. The oil-filled type's disadvantage: leakage may cause product contamination problems.

The wet motor will not fit in as a substitute for splashproof-type motors, despite its chemically inert insulation system. Like all immersion motors, it is designed to operate completely submerged in liquids. By using the liquid in which it is immersed as a coolant, the motor can be mounted on a smaller frame than is required to dissipate the heat of air-cooled types.

Although the wet motor's advantages and disadvantages have been pinpointed, GE has only partially explored the potential applications. Chances are, it will complement, rather than compete with, existing motors. And if the insulation system meets the test of chemical attack, it may be the answer to the failure of pump seals at high pressures.

# No embrittlement! Lowest cost! ASME Code approved!

## In the subzero operating range . . . Specify Alcoa Aluminum equipment and piping

The flow chart details a tonnage oxygen plant now in actual operation where process temperatures average below minus 300° F. Notice that virtually all of the equipment and process piping are ALCOA® Aluminum. There's a good reason: aluminum is the lowest cost metal able to perform satisfactorily at low temperatures.

At subzero temperatures, ASME code approved aluminum alloys suitable for welded construction display improved yield and tensile strengths with no reduction in ductility or resistance to shock loading (see graphs). There is no embrittlement!

And in these operating temperature ranges, aluminum offers other valuable benefits . . . light weight . . . excellent resistance to corrosion . . . great strength in alloys . . . high thermal conductivity . . . nonmagnetic, nonsparking characteristics . . . nontoxicity . . . and excellent reflectivity. It is highly workable and lends itself readily to a variety of welding or brazing techniques for easy fabrication.

When *you* are looking for a low cost answer to the many problems of satisfactory equipment and piping performance in low temperature operations, *it will pay you to specify Alcoa Aluminum.* ALCOA engineers have worked with aluminum in the process industries for over 30 years. Use their accumulated knowledge to help you find satisfactory answers to *your* process equipment problems. Consult the nearby ALCOA sales office listed in the Yellow Pages of your telephone directory . . . or outline your equipment requirements in a letter to ALUMINUM COMPANY OF AMERICA, 906-J Alcoa Building, Pittsburgh 19, Pa.

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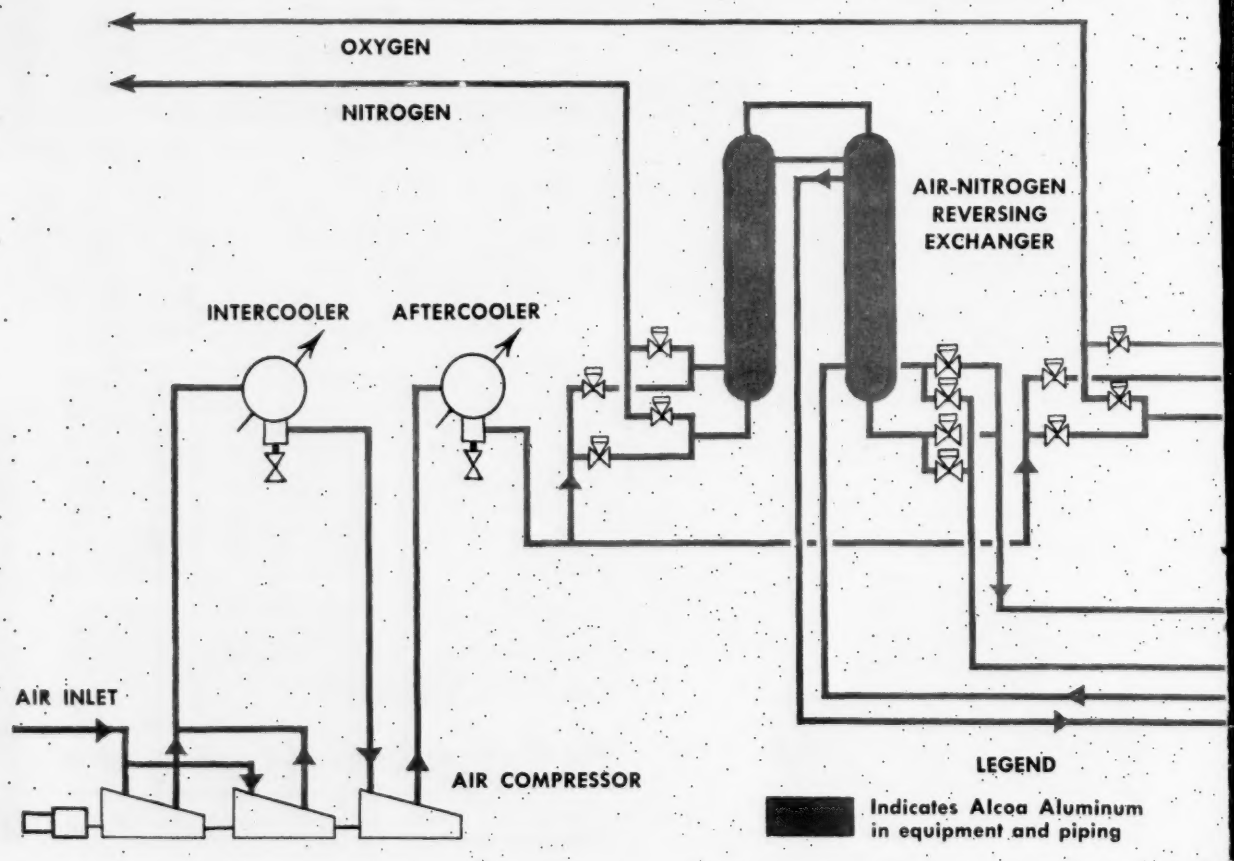
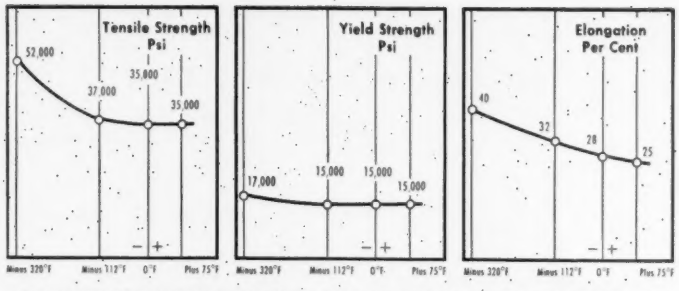
Exciting Adventure
ALTERNATE MONDAY EVENINGS

ALCOA ALUMINUM

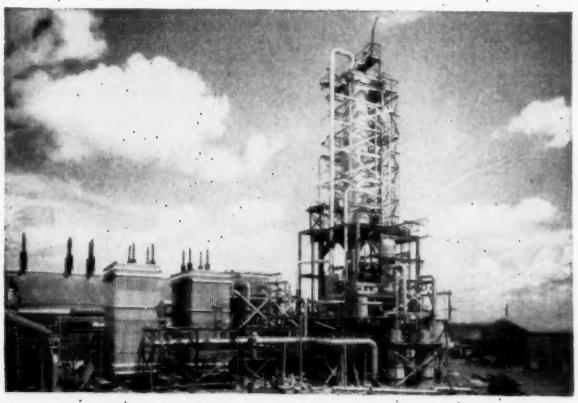
THIS FREE BOOK is filled with detailed data on the behavior of aluminum in the process industries . . . the result of more than 30 years of Alcoa engineering experience with aluminum in a variety of applications in nearly every temperature range. Use it as your guide to trouble-free, corrosion-free process equipment and piping. Write today for *Process Industries Applications of Alcoa Aluminum.*






**LOW TEMPERATURE PROPERTIES OF ALCOA ALLOY 5154-0**

Alcoa Aluminum actually increases in strength with no loss in ductility as temperatures drop to minus 320°F and below. Alloy 5154-0, for example, improves 50% in tensile strength, over 13% in yield strength and approximately 60% in elongation.



Photograph shows installation of Alcoa Aluminum equipment and piping in oxygen plant detailed in flow diagram. Harp-type heat exchangers (left) are dip-brazed assemblies with thousands of fins for best heat transfer.




Diagram of first successful low pressure tonnage oxygen plant . . . designed to produce 175 tons of 95% oxygen per day for the manufacture of oxygenated chemicals. All of the process piping and most of the equipment are Alcoa Aluminum.

## PRODUCTION EQUIPMENT

**Liquid Nitrogen Generator:** Arthur D. Little, Inc. (20 Acorn Park, Cambridge 40, Mass.) offers a new push-button-controlled liquid nitrogen generator system for supplying moderate demands—95 liters/day of 99.5% pure liquid nitrogen. Major components of the automatically controlled system: an ADL nitrogen column, modified Norelco (North American Philips, Mt. Vernon, N.Y.) gas liquefier (*CW, Sept. 29, '56, p. 59*), and a 200-liter storage tank.

•

**Identification Tabs:** Self-adhesive, trade-identifying emblems for safety "hard-hats," are a new addition to the line of industrial safety products of the W. H. Brady Co. (727 W. Glendale Ave., Milwaukee 9). The vinyl-cloth emblems will stick without moistening to metal, plastic, painted and unpainted hats, conform to the hat contours. Emblems are easily removed when hats are changed. Thirty standard emblems, in two colors, are available for trades such as carpenter, electrician, machinist, pipefitter.

•

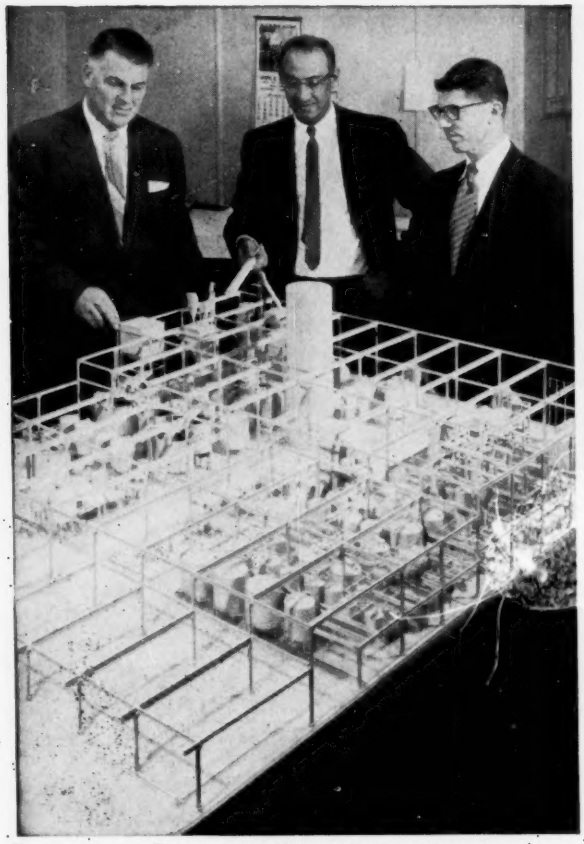
**Temperature Probe:** Texas Instruments Inc.'s Semiconductor-Components Div. (P.O. Box 312, Dallas) is out with a new monocrystalline silicon temperature probe, dubbed Sensistor. The glass-encased probe is 0.078-in. diameter and 0.5-in. long; has a large temperature coefficient of resistance claimed to permit quick, accurate temperature measurement. Sensistor is suggested for telemetering and liquid-fuel temperature measurement. Temperatures to 200C can be measured.

•

**High-Vacuum Gauge:** NRC Equipment Corp. (Newton 61, Mass.) offers Model 521 thermocouple gauge for measurement of vacuums in the 2,500 to 1 micron range. Unit is built to withstand 60-psi. pressures.

•

**Vacuum Pumps:** F. J. Stokes Corp. (5500 Tabor Rd., Philadelphia 20) has redesigned its Microvac rotary vacuum pumps for larger pumping capacity, increased volumetric efficiency, low power requirements, minimized oil contamination, and more compact design. Model 212-H, first of the redesigned series to be introduced, has a 140-cfm. displacement, 5 HP. motor, ultimate vacuum of 10 microns Hg.



Project planned. Left to right: H. W. Schaffner, production vice president; C. W. Schwenzfeier, Jr., engineering vice president; and N. W. Bass, sales vice president — inspecting an intricate scale model of the new Brush Beryllium plant at Elmore, Ohio.

Project completed! The same executives in front of control panel in new Elmore plant, which contains the latest equipment for producing beryllium. Hydroxide plant has rated capacity of 240,000 lbs. of beryllium a year, but can be readily expanded.

# $6 MILLION DREAM COME TRUE!

This is a success story.

It began in 1931 (after ten years of research).

The project: to pioneer the development, manufacture, and application of a new industrial metal — beryllium.

The Brush Beryllium Company, a privately owned enterprise, did it — without fanfare or fuss — overcoming obstacles in the design of facilities to perform newly developed chemical and metallurgical processes.

Today, their fondest dreams have come true in the shape of a new plant that embodies the most advanced equipment yet developed for producing beryllium. This new $4.5 million plant completes a $6 million complex for the production of beryllium and its alloys.

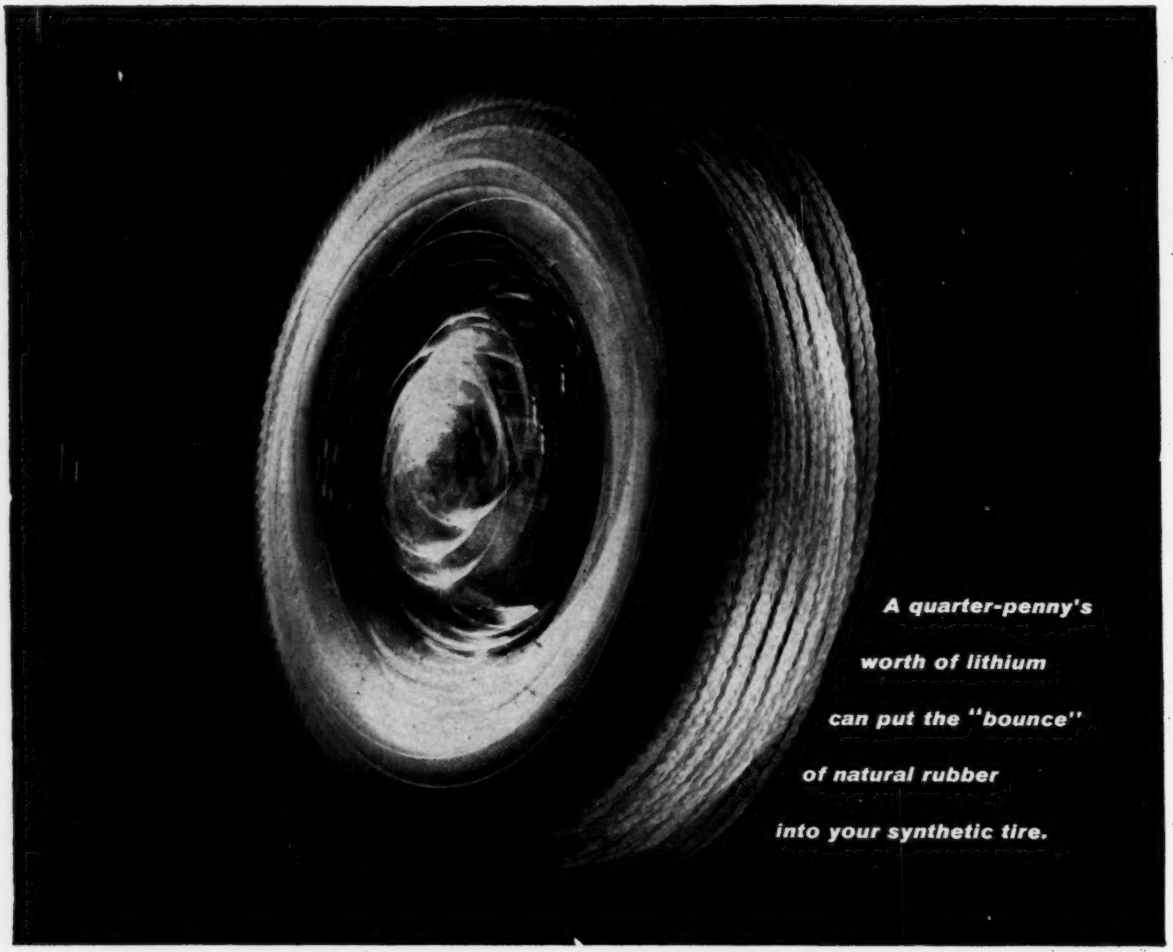
**What is beryllium?** The only light metal with a high melting point, stiffer than steel and stronger for its weight than any other metal.

**Uses?** The surface has hardly been touched . . . but beryllium is already used in the atomic energy, electronic, and aircraft industries; in cars, appliances, and business machines, to name a few.

**What does this new plant mean?** It means that private industry, along with government agencies, now has ready access to sufficient supplies of versatile beryllium to adequately meet their present needs — as well as to meet expected future requirements.

**Where does Wyandotte come in?** In the words of Brush Beryllium executives: "We met a great challenge. Wyandotte is one of our trusted suppliers, and has aided us immeasurably with fine technical service. Advice on forms of chemicals to buy, how to store and how to handle soda ash and caustic influenced the actual design of the new plant."

If you can use a supplier of Wyandotte's capabilities . . . contact us. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*




# A little lithium does so much

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Now . . . more than ever before . . . it pays to explore the advantages of lithium. The new low cost of lithium compounds opens the way for hundreds of products to benefit from the unique properties of this material. And the most rewarding part about it is that it takes so little lithium to get such big results—

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- 89 cents buys all the metallic lithium needed to degasify *one thousand pounds* of molten copper
- 35 cents' worth of lithium citrate will stabilize *one hundred pounds* of ceramic casting slip

The fastest way for you to find out what lithium might add to your products—*at so little cost*—is to write for a sample of the lithium compound you are interested in. Be sure to ask for Foote's data folder entitled "The Chemical and Physical Properties of Lithium Compounds." For specific information on the application of lithium to your products, write Technical Literature Dept., Foote Mineral Company, 420 Eighteen W. Chelten Bldg., Phila. 44, Pa.

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# Oldest Specialties Maker

**There's more than one way to sell chemical specialties. It's possible to follow all the rules and go broke—or flaunt them and prosper. Here's nonagenarian Jacques Romano, who doesn't follow the book. His unorthodox sales methods haven't garnered him a fortune. Still, he's managed to stay in business a long, long time, a real trick in a field noted for a high percentage of failures.**

Most of Mr. Romano's time is spent at his Maiden Lane office—a large single room, containing a lab in the back and a mailing room (decorated with Sunday-supplement covers) in the front. Near the entrance, just off a small foyer (which has a painting by Romano for decoration), is Romano's desk — the top of which is covered with a battery of ball-point pens, an assortment of bottles and a box full of upended nose droppers. For aesthetic appeal there's a carefully cut out pin-up girl pasted to the desk. Romano does all the formulation of his products, all the wrapping and mailing, as well as writing his own direct mail literature.

**Inside and Out:** The products that Romano is currently pushing are J-R Liquidine #4, an iodine solution for internal use; Roma-Nol, for external use; and Monodine, for accessible mucous membranes. In addition, there are Ponaris oil, Bahim oil, and Modine oil, three vegetable oil compounds with iodine. He sells these products only through the mail, depending on word-of-mouth recommendation for new business. Manhattan General Hospital is one of his big customers and the West Coast is becoming more important to him—"the naturopaths out there love my products." He doesn't get on the road much to sell his wares.

And he is not much of a believer in advertising — "I never spent $10 for it in my life" — but he's got some strong ideas on how it should be done: "One of the best things you can use are those ads in buses and subways. You know why? Because you have to tilt your head back when you look at them. That causes you to constrict your vascular-muscular system in the back of your neck; you lose your sense of judgment."

Romano practices what he preaches, says, "Whenever I sell somebody a product, I hold it above their noses, like this."

In selling his products to doctors, Romano says he's found it good practice to send small gifts for their wives. "I usually send them some Chanel No. 5 — which I make myself. I'm not a technically trained man but I'm a first-rate chemist. You have to send them small bottles, about half an ounce, otherwise the wives think they're getting something cheap."

Romano got into the business of selling his iodine products because he was always interested in why people got sick — and well, too. "You've probably heard of my work in suggestive therapy."

When he was young, says Romano, he ran away to become a herbalist. "Talk about your tranquilizers if you want. I can produce the same effect without using habit-forming materials. Learned most of the stuff while visiting the monks at the Tibetan lamaseries."

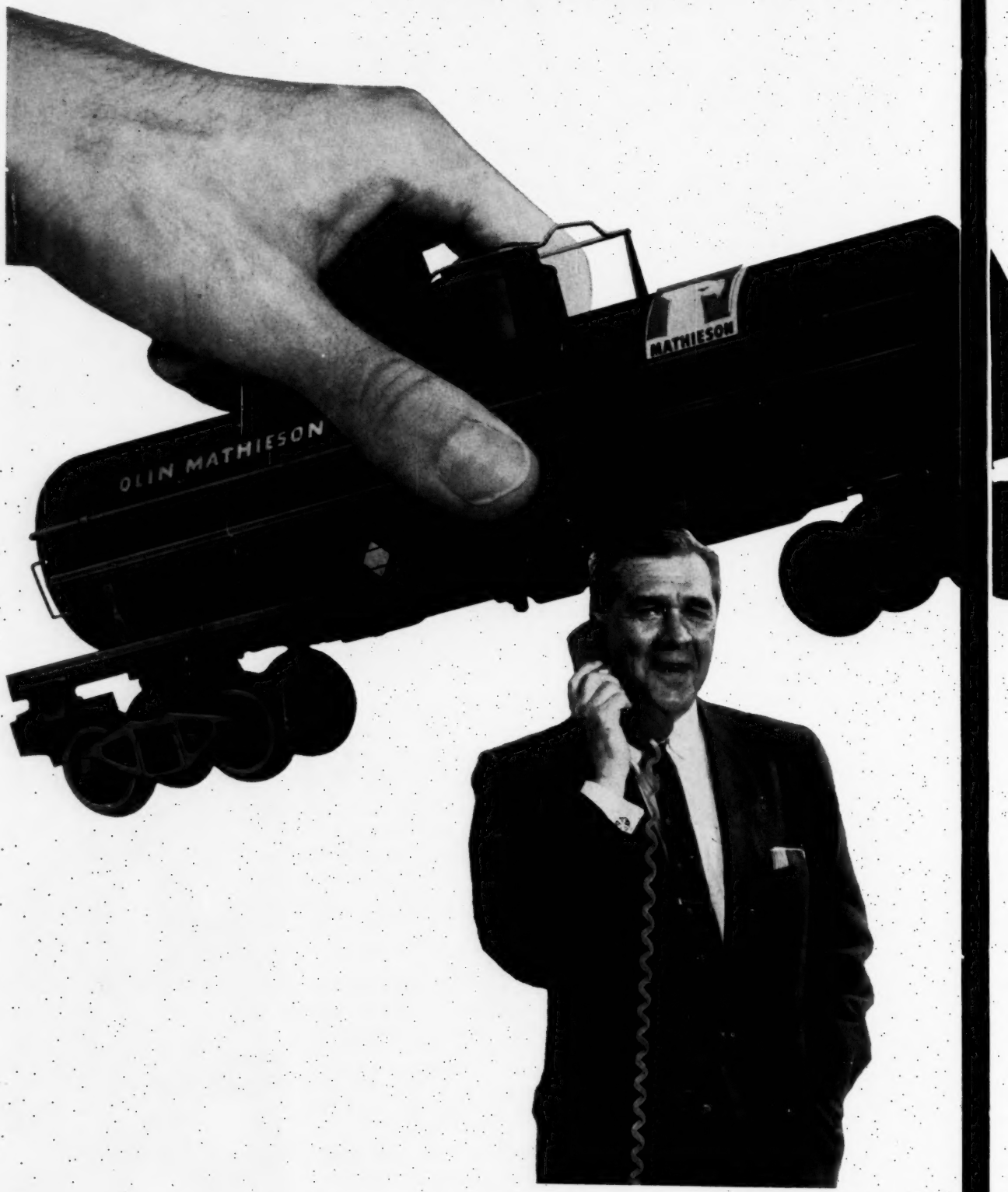
Jacques Romano's day as a specialty inventor, maker, and merchandiser runs like this: He gets up around 5 a.m., has his breakfast, then takes the subway to the "new" headquarters of his Jamol Co. in downtown Manhattan. There he'll put in a 15-hour workday, turning out his line of iodine-containing proprietary medicinal oils. Romano, a spry and garrulous 94 years old, himself is the Jamol Co.

"I'm the president, vice-president and office manager," he told *CW*, "and when I get to the office and find that it needs sweeping out, I'm also the janitor. Then, when the place is all cleaned up, I elevate myself to president of the company — again, unanimously."

Romano isn't quite sure when he

CW PHOTOS—FRANK AMELIA

**I'm the president, vice-president, office manager, and sometimes the janitor, says Jamol's garrulous Jacques Romano.**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**PLANNING.** A business of chemicals service for over 60 years, Olin Mathieson provides a wide range of experience applicable to your own situation.

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started Jamol ("Ja" for "Jacques," "Mol" for his late wife, Molly) but he pegs the date somewhere around the early thirties — which would make him about 70 when he started his firm.

**Turn of the Century:** Of the work he did prior to setting up the Jamol Co. Romano speaks most fondly of his connection with Eastman Kodak. "Great crowd up there around the turn of the century," he says. "They couldn't do too much for me when I was with them."

Included among other occupations Romano mentions are aircraft design ("I was one of the men responsible for the development of the monoplane") and plant consulting work ("I helped the Japanese set up a photographic paper plant").

An unexpected talent Romano possesses is his way with cards. "I happen to be one of the really great sleight-of-hand men in the world," he says proferring a card pack. "By the way, look at my hands — did you ever see anything like that? Of course not. They're writing me up in some medical books right now. I've the body and brains of a middle-aged man."

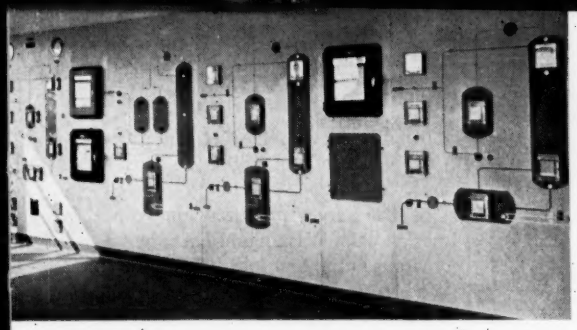
Asked how business is these days, Romano says that Jamol's business is "not too good" but that it could be great if someone took it over and devoted some effort to it. He'd be willing to sell out for enough cash to insure the small needs that he has.

"There are three reasons" explains Romano, "why I haven't got out of the business so far. The first's lack of capital and the other two are the same."

Donning his jacket (he's a meticulous dresser), Romano, while moving down the corridor at a Trumanesque pace, gave *CW*'s editor some tips on how to write the story and the photographer advice on developing the pictures. In the lobby, he told the photographer, "I'm going your way and you can come along with me—if you think you can keep up. I'm sort of in a hurry."

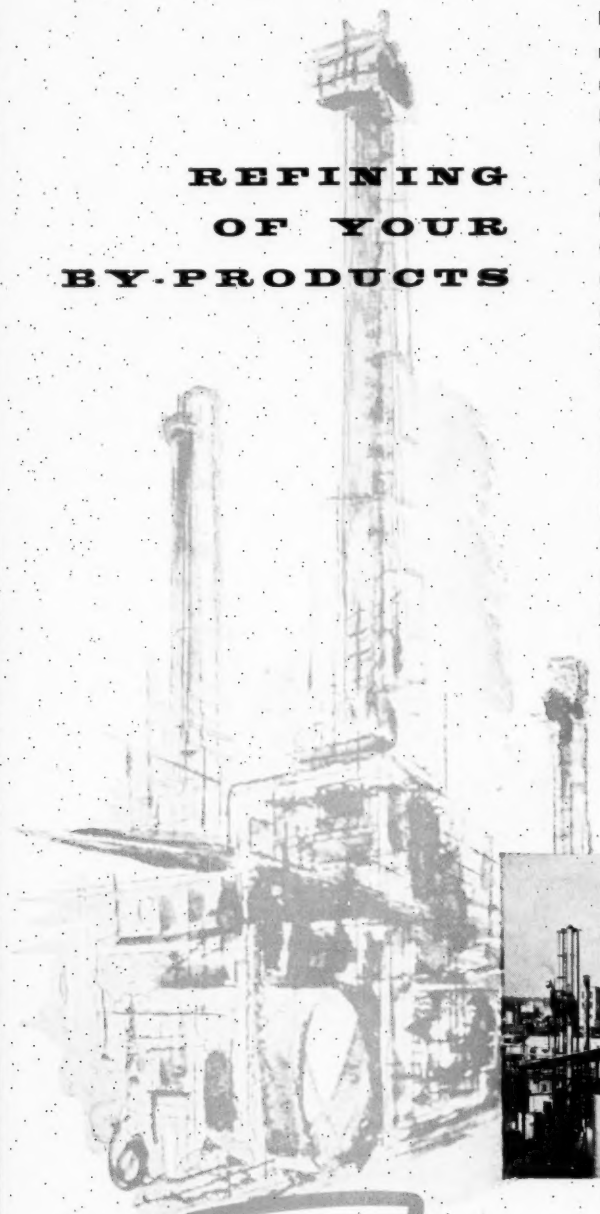
## Pointers on Paint

**Paint sellers** are looking more and more to the do-it-yourselfer for his sales dollar. Comprising only 40% of the market in '48, the amateurs are now buying seven out of every ten cans of paint. That's one finding of a



The facilities and experience of Truland may be employed advantageously for the economical upgrading and disposal of solvent mixtures and organic by-products.
Our technically trained personnel are available to discuss the refining of any solvent mixture or organic by-product.

# REFINING OF YOUR BY-PRODUCTS



Partial List of materials processed

- Acetone
- Amyl Acetate
- Amyl Alcohol
- Benzene
- n-Butyl Acetate
- n-Butyl Alcohol
- Butyl Cresols
- Butylene Glycol
- Capryl Alcohol
- Carbon Tetrachloride
- Chlorbenzene
- Chloroform
- Dibutyl Phenol
- Dibutyl Phthalate
- Dicapryl Phthalate
- o-Dichlorbenzene
- Diethanolamine
- Diethylene Glycol
- Dimethyl Phthalate
- Dimethyl Sebacate
- Dipropylene Glycol
- Dodecyl Alcohol
- Dodecylbenzene
- Ethyl Acetate
- Ethylene Dichloride
- Ethylene Glycol
- Ethyl-Hexanediol
- Ethyl Lactate
- Glycerine
- Glycol Ethers
- Hexyl Alcohol
- Isobutyl Alcohol
- Isodecyl Alcohol
- Isooctyl Alcohol
- Isophorone
- Isopropyl Acetate
- Isopropyl Alcohol
- Methyl Alcohol
- Methyl Amyl Alcohol
- Methylene Chloride
- Methyl Ethyl Ketone
- Methyl Hexyl Ketone
- Methyl Isobutyl Ketone
- Monoethanolamine
- Naphthas
- Nitrotoluols
- Nonyl Phenol
- Octyl Acetate
- Perchlorethylene
- n-Propyl Alcohol
- Propylene Glycol
- Pyridine
- Toluene
- Trichlorbenzene
- Trichlorethylene
- Tricresyl Phosphate
- Triethyl Amine
- Triethylene Glycol
- Trimethyl Borate
- Vinyl Acetate
- Xylene

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## TRULAND CHEMICAL COMPANY

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DIVISION OF THE TRUBEK LABORATORIES

## SPECIALTIES

17-state survey by E. Norman Kagan Co., New York management consultants.

- The Survey produced some other market data: Washington D.C., and its environs is the best location in eastern U.S. to open a paint store. In the South Atlantic states, Florida, Georgia and Virginia show the greatest sales potential.
- Small-town residents, despite common belief, travel less to buy paint than their urban cousins. In towns under 10,000 most consumers buy within a five mile area, while median travel is over nine miles in towns with 10,000 to 100,000 population.
- Ten times as much paint is purchased for repainting purposes as for decorating new residential construction. Total breakdown: replacement, 60%; new residential construction, 6%; commercial, 24%; industrial, 10%.
- Paint stores don't always sell the most paint. In the South Atlantic states, the paint dealer (34% of sales) runs second to the hardware store (40.3%) and ahead of the lumber dealer (25.7%).
- Manufacturer-owned retail outlets have increased their total of paint sales 12-fold in the last 25 years. From less than 2% in '33, they now hold 25% of the market.

Kagan's group also uncovered this fact: although ½ of 1% of total number of companies in the paint industry is responsible for 37% of sales, over 1,400 paint manufacturers compete for the remaining 63%.

## PRODUCTS

**Liquid Thiram:** Du Pont has developed what it calls the first commercial liquid suspension of thiram (tetramethylthiuram disulfide) for slurry treatment of seed and for use as a paint or spray repellent against rodents, rabbits, deer and birds. Called Arasan 42-3, the material is a stable suspension of extremely fine particles of thiram, contains four lbs. of active material per gallon.

•

**Silicone Foam Killers:** Two new antifoams have just been placed on the market by Union Carbide Corp.'s Silicones Division. Sag 47 Silicone Antifoam Emulsion Fluid is for nonaqueous systems and Sag 47 for aqueous systems.

IN FIRE EMERGENCIES

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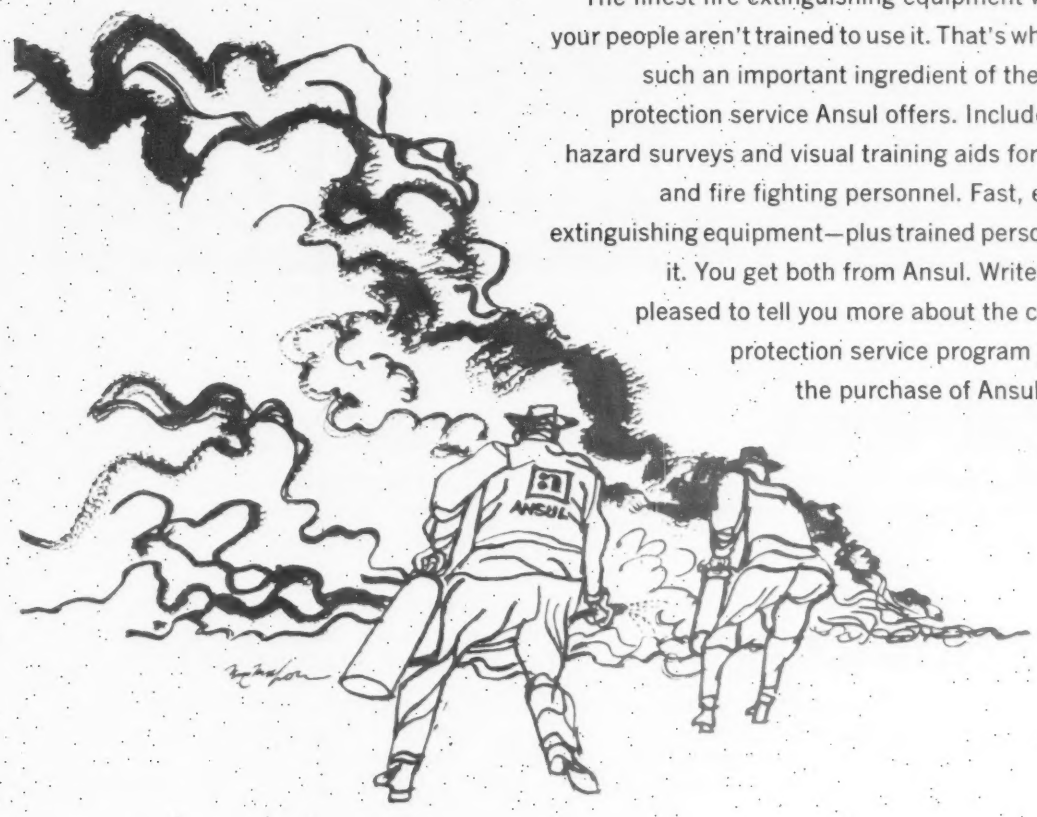
The finest fire extinguishing equipment won't help if your people aren't trained to use it. That's why training is such an important ingredient of the unique fire protection service Ansul offers. Included are plant hazard surveys and visual training aids for your safety and fire fighting personnel. Fast, effective fire extinguishing equipment—plus trained personnel to man it. You get both from Ansul. Write us. We'll be pleased to tell you more about the complete fire protection service program you get with the purchase of Ansul equipment.

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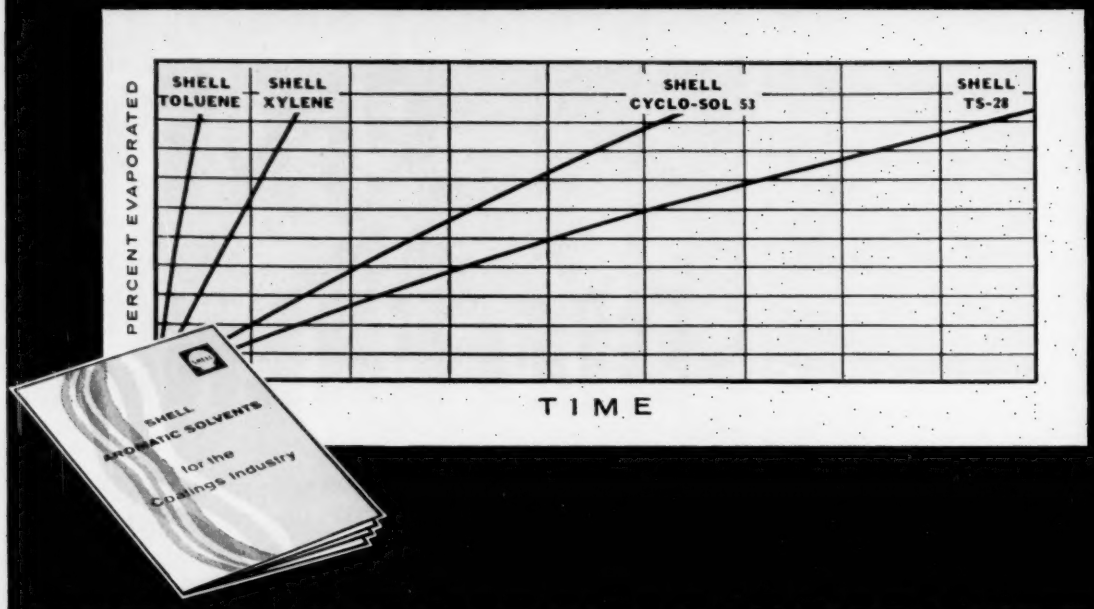


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Typical properties are given in the booklet shown. Write for a copy.

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... for applications where very fast evaporation and high solvency are required.

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... has an exceptionally narrow distillation range, is slower drying than toluene.

## SHELL CYCLO-SOL* 53

... an excellent solvent with higher flash point and slower evaporation rate than xylene. Recommended for baking finishes and flow coating.

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# Technology Newsletter

CHEMICAL WEEK
September 6, 1958

**Flame-retardant high-density polyethylene in a range of colors** was launched last week by W. R. Grace & Co. The high-density Grex polyethylene is now available in a range of colors that include: white, black, grey, dark blue, light blue, green, pink, orange, scarlet, yellow.

Du Pont has been offering its low-density material, called Rulan, in flame-retardant form and in a "limited range of colors." And some other makers say they will supply flame-retardant polyethylene if requested.

Call for such material thus far has been limited. Mostly, it has been used for wiring—although all polyethylene will burn, the flame-retardant type is self-extinguishing once the flame has been removed. But there are indications of increased interest in high-density (more rigid) material for television yokes (electrical-component tube housings), baby-bottle warmers, cylinder heads for tanks containing nitrogen, oxygen and acetylene.

**The flame-retarding agent is a chlorinated wax** and antimony oxide compound for which Du Pont holds U.S. Patent 2,480,298. But the patent situation is tricky: Diamond Alkali also holds a patent on the same materials and there is a cross-licensing agreement between Du Pont and Diamond. Grace is believed to be operating under license from Diamond.

And, while Grace is the only high-density polyethylene producer to offer the flame-retardant type in a color range, Koppers' high-density polyethylene is being made flame-retardant by converters; it, too, is said to be available in a range of colors, Koppers' material is Ziegler-licensed; Grace's is licensed from Phillips.

•

**Chemistry continues to bulk big in West Germany's research** effort. And more and more companies are making patent applications there. These facts have come out in the latest statistics of the Deutsches Patentamt, Munich. Total patent applications made in 1957 were 52,988. Chemical procedure patents accounted for 16% (8,079), second only to electronics. Of the total applications, 29.54% were by "foreign" companies. And U.S. companies have a stake in 33.6% of these.

Germany issued 20,467 patents in '57 (as opposed to patent applications); 1,761 were in the field of chemistry.

•

**Nonanol may be the key to inhibiting potato sprouting** during indoor storage. It's applied to potato stocks by standard fumigation methods. Imperial Chemical Industries Ltd. of Great Britain developed the method, still to be tested in the U.S.

•

**The Astron—newest of the fusion devices** being studied under AEC's Sherwood Project—was described for the first time last week by

inventor Nicholos Christofilos, a physicist at the University of California Radiation Laboratory (Livermore, Calif.). Described as a radical departure from all other approaches, the Astron will use relativistic (high-energy) electrons for confining the plasma and heating it to the required temperature (100 million C) for the fusion reaction.

The apparatus will consist of a long vacuum cylinder within which is established a magnetic field parallel to the axis. Under the influence of this field, electrons at an energy level of several million electron volts will be forced to travel in helical orbits, and thus form a concentric cylindrical layer of electrons (the E layer) within the vacuum cylinder. When the number of E-layer electrons exceed a certain critical value, they create an internal magnetic field that reacts with the external field to form a "magnetic bottle" capable of containing plasma. Then, when deuterium or tritium atoms are injected into the cylinder, the E-layer electrons produce ionization, and generate heat by colliding with electrons in the plasma.

•

**New data on formulation of blister-resistant paints** is available in a report issued by Western Red Cedar Lumber Assn. (Seattle). Research by Timber Engineering Co. for the association showed that the most satisfactory formulations of blister-resistant exterior paints for wood siding contained titanium dioxide and some form of silica or silicates. Most of them employed an alkyd resin vehicle. Conspicuous by its absence from satisfactory formulations was zinc oxide, a stand-by in older paint recipes.

But S. B. Coolidge, Jr., vice-president and director of auxiliaries for Sherwin-Williams, points out that zinc oxide imparts some distinct advantages to paint—clear appearance, mildew resistance, long life. Agreeing that it does adversely affect blister resistance when used in a prime coat, Coolidge says that use of zinc oxide in "second coatings" provides a highly satisfactory finish.

•

**First large-scale rocket thrust firings utilizing liquid fluorine** have just been completed by Bell Aircraft (Buffalo). Ray P. Whitman, first vice-president of Bell and general manager of the firm's Niagara Frontier Division, which did the fluorine research, revealed the accomplishment last week, called it the "last major breakthrough in chemical rockets."

This could be significant for producers of fluorine and other oxidizers for rockets. Fluorine has long been recognized as the best chemical oxidizer for rocket applications. And engine designers have been confident for some time that they could build a rocket using fluorine. The work at Bell should reinforce this confidence.

•

**Apparently identical 16-$\beta$-methyl steroids** were reported simultaneously (*Journal of the ACS* Aug. 20) by two different firms: Merck Sharp and Dohme, and Schering. Schering says its work was submitted for publication first. Merck has no comment.


## "Dutch Boy" research brings the newest look in vinyls

# . . . crystal clarity with staying power

The latest from National Lead research is INVIN* 91 . . . new "Dutch Boy" *liquid* barium-cadmium vinyl stabilizer.

With Invin 91 stabilizer, vinyl producers can now give "clears" a new crystal clarity that lasts and lasts. Excellent freedom from initial heat yellowing. Exceptional heat, light stability.

When it comes to colored stocks . . . well, you've never seen clearer or truer shades maintained in vinyls. Even long exposure to severe heat . . . as under the rear window of a car . . . has little effect.

### National Lead research has bettered many products

All in all, some twenty widely used vinyl stabilizers have originated in National Lead laboratories. One overcomes a color problem in asbestos-filled vinyl flooring. Another provides outstanding protection for vinyls exposed to outdoor weather. Eight meet specialized problems affecting life of vinyl electrical insulation . . . solve problems of other products as well. And so it goes! Vinyl after vinyl improved.

Then there are the "Dutch Boy" gellants . . . BENTONE® 18-C, 34 and 38 and "Dutch Boy" BEN-A-GEL.® These versatile chemicals control flow properties, step up performance of a host of paints and other compounds.

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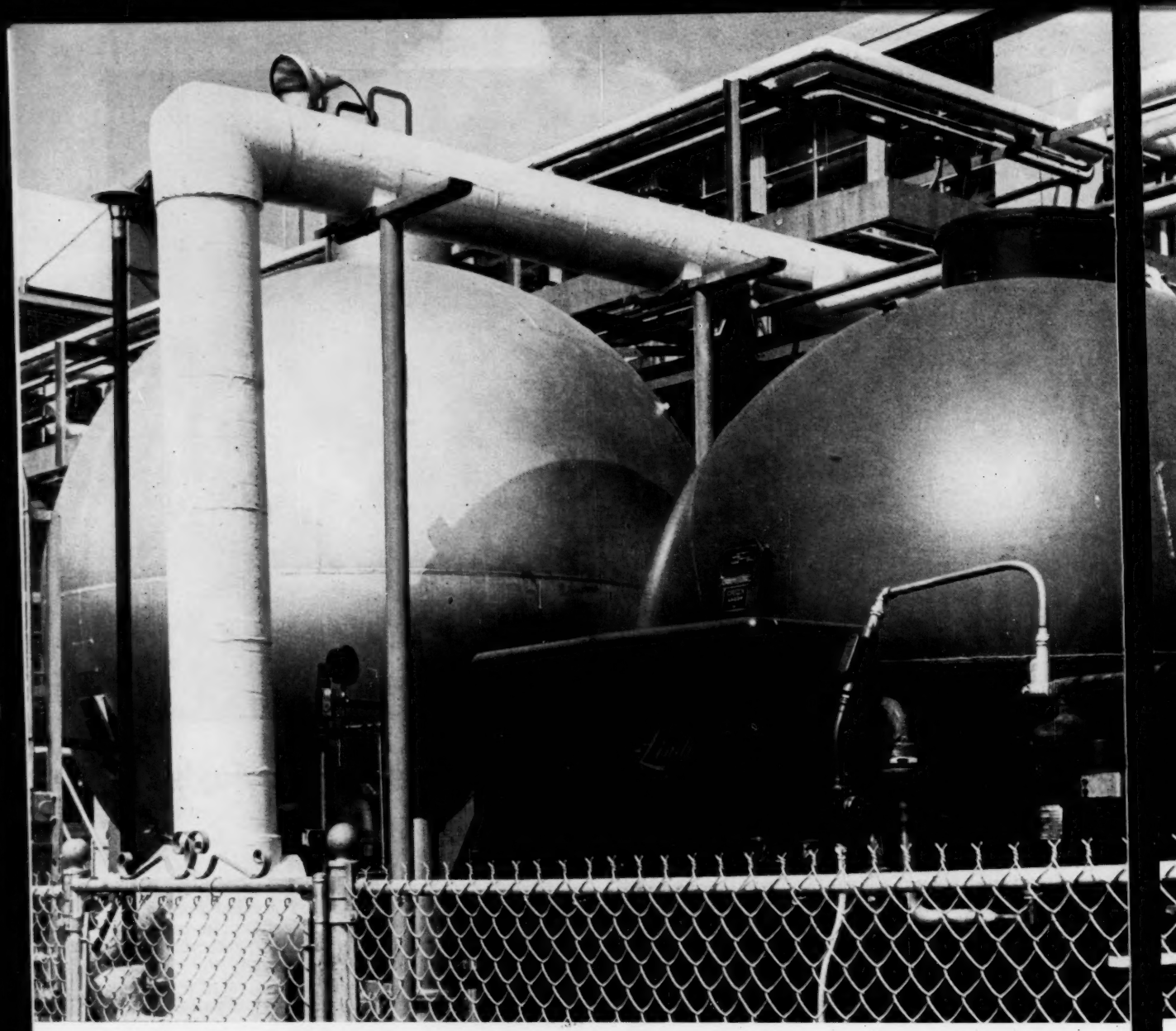


Horton spheres for liquefied gas storage dominate Merck & Co.'s 25,000-lbs./year ultrapure silicon plant, now

# Plenty of New Capacity Speeds Pace

**New producers, new product grades, new plants highlight this week's news of semiconductor-grade silicon.**

• Merck & Co. is now in full production—at a pace better than 25,000 lbs./year—at its Danville, Pa., plant, which has been in partial operation since the beginning of the year (*CW, Jan. 18, p. 55*).

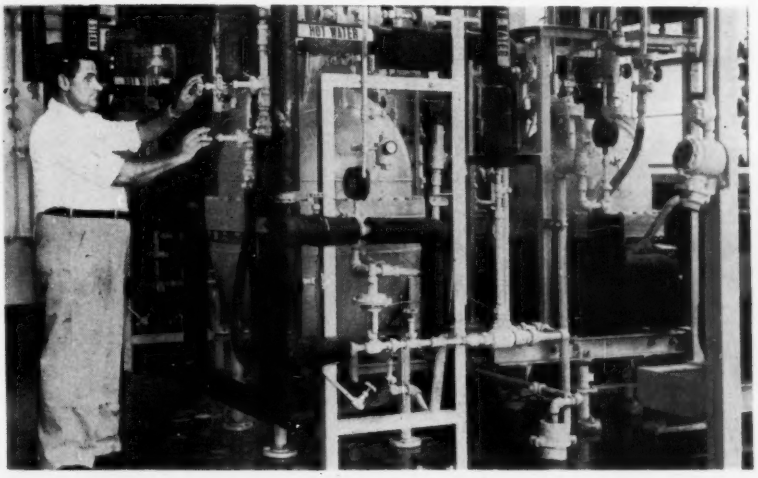
• The Toa Alta, Puerto Rico, plant of International Metalloids owned by W. R. Grace & Co. and the French firm of Pechiney is expected to be ready for startup in a few weeks. It is rated at 20,000-lbs./year capacity.

• Mallinckrodt Chemical Works (St. Louis) is now marketing its limited production of the semiconductor.

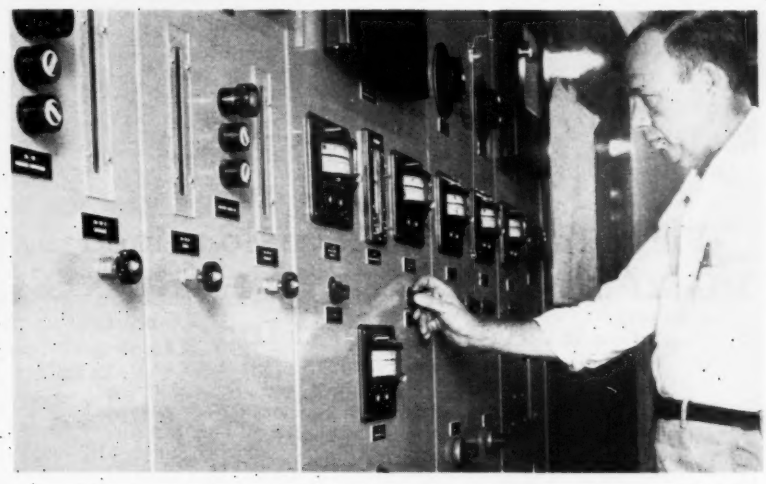
• Foote Mineral Co. plans to join the parade by year's end with a commercial unit at its recently acquired tract of land near Exton, Pa.

• Philco Corp. is now building a pilot-size silane-decomposition unit for the Signal Corps at Lansdale, Pa., which is expected in operation in a few months.

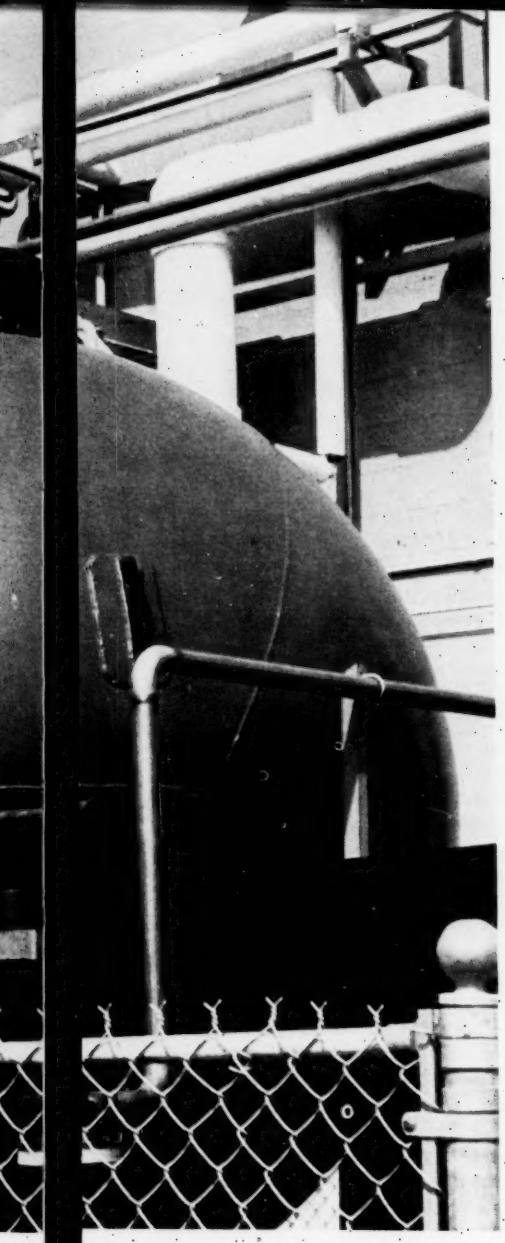
• Du Pont is developing its new purer-than-ever grade (made by a process licensed from International Telephone and Telegraph (*CW Technology Newsletter, June 7*) at its Newport, Del., facilities. It has also licensed a crucible-free "crystal-puller" (a technique for forming crystals) from IT&T's British subsidiary, Standard Telephones & Cables.



Raw material purification step precedes actual silicon production. Merck has licensed the Siemens process for its $5-million plant.



Panel has controls for purification of gas prior to decomposition.



in full production at Danville, Pa.

# of High-Purity Silicon Production

• Sylvania Electric Products is making a new type of silicon at Towanda, Pa. Sylvania's product is said to be more readily "doped" (i.e., the controlled addition of impurities to gain desired electrical properties).

**Supply and Price:** The full entry of Merck and the impending debut of International Metalloids insures a plentiful supply of semiconductor-grade silicon. Combined capacity of these plants is over 45,000 lbs./year; Du Pont can produce 50,000 lbs./year and Sylvania, Texas Instruments (Dallas), Eagle Picher (Miami, Okla.,) and Westinghouse (a captive producer) add to available capacity. Trade sources put current capacity in excess of demand, but estimates of future requirements are high enough to encourage new producers.

Merck's main selling point will be the purity of its new grade of silicon: it has less than 1 part of boron per 6 billion parts of silicon and minimum resistivity of 1,000 ohm-cm. Currently, the only other producer claiming production of silicon of this purity level is Westinghouse—like Merck, a licensee of the Siemens process.

However, the customers will have to weigh their need for the new purity against its price. The high-purity material is priced at about $750/lb. for poly-crystalline rod form, ready for floating-zone refining; and

$2,000/lb. for monocrystalline silicon, already zone refined. This compares with $330/lb. generally asked for the 100-ohm-cm. grade (which Merck also offers).

International Metalloids will produce a monocrystalline product containing 1 ppb. of boron with a resistivity of 300-400 ohm-cm. sell it for $330/lb. Grace Electronic Chemicals, Inc., a newly formed Grace subsidiary (*CW, Aug. 9, p. 25*), will do the actual marketing.

Mallinckrodt is offering a 3-ppb. boron, 100 ohm-cm. grade at $730/kg. (about $330/lb.). Mallinckrodt still in lab scale and pilot-plant production, won't tell its expansion plans.

**Plants Aplanning:** Foote is now building facilities at its 54-acre site near Exton to produce silicon of ultra-high purity by a new process. To follow: a $3-million research and engineering lab and "hazardous operations" facility for work with a variety of materials.

Philco's plans for a pilot plant housing government-owned equipment are not clear yet. Present goal: production of 500-ohm-cm. silicon.

**Oldtimer Readies New Grade:** Du Pont, which pioneered semiconductor-grade silicon production, says its IT&T license will allow it to produce a grade "expected to surpass all types of silicon presently commercially available". When Du Pont will decide to produce this commercially, however, is a matter largely dictated by the market.

Neither Du Pont nor IT&T will give details on the process, but some clues may be found in patent applications made by IT&T subsidiaries. For instance, British patent 793,718, issued to Standard Telephones & Cables (London), describes a key improvement in producing high-purity silicon by the silane-decomposition route. First, highly pure silane is made by reacting an excess of lithium aluminum hydride with silicon tetrachloride. Troublesome diborane is kept to a minimum in the silane by the lithium compound, which converts trace quantities of boron trichloride in the reagents to lithium borohydride.

Australian patent applications 31,951/57 and 31,952/57, issued to Standard Telephones & Cables (Sydney), provide clues to other phases of production. According to these applications, a stream of silane is played on an inductively heated seed of silicon.

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The fact that Pennsylvania manufacturers will save an estimated $45 million in taxes during the current biennium proves our point. To create this "tax climate" favorable to new and expanding industry, the state legislature has taken these steps:

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5. Reduced the sales tax on purchases by manufacturers.

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CHARLES M. FIFE, *Manager*
*Area Development Department*


WEST PENN POWER, Area Development Department, Cabin Hill, Greensburg, Pennsylvania CW-1

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## ENGINEERING

which is gradually withdrawn from the field of the induction coil, forming a rod of silicon. The IT&T "crystal-puller" is one method that could be used to convert the rod thus formed into a single crystal of silicon.

**Tailored Silicon:** Sylvania, with over two years of commercial experience in high-purity silicon, is now out with "uncompensated" silicon, which it says will allow closer calculation of doping agents by customers. Thus, according to Sylvania, there is a higher yield of usable material per treated crystal, with resultant cost savings. Highest specified minimum resistivity is 100 ohm-cm., but boron level has been reduced to 1 ppb. Sylvania has kept its $790/kg. ($359/lb.) price, in spite of the Du Pont price cut of last May (*CW Market Newsletter, May 24*), which was followed by most producers.

Sylvania has not revealed any of its process, but its Australian patent application 31,346/57 describes a method of producing high-purity silicon tetrachloride—possible starting material—by extraction with fuming sulfuric acid.

**On the Sidelines:** In addition to those companies actively moving plants toward commercialization, other firms are engaged in research and development of various processes. The Air Force is sponsoring research on silicon tetraiodide processes at General Electric's Pittsfield, Mass., plant, and on silane at Metal Hydrides Inc.'s Beverly, Mass., facilities. Metal Hydrides has reported laboratory quantities of several-thousand-ohm-cm. silicon produced without zone refining.

Monsanto Chemical Co. and Kawecki Chemical Co. are others watching the scene closely.

Plainly, the boom in semiconductor silicon is just beginning.

## PROCESSES

**Gas Synthesis:** A new process that reportedly boosts yields of synthetic petroleum products has been developed by the Dairen Petroleum Institute of the Chinese Academy of Sciences. Raw materials are coal (anthracite, bituminous and inferior grades) and natural gas; yield is 191 grams of synthetic gasoline per cubic meter of gas (carbon monoxide and hydrogen). Process requires fused iron in a fluidized reactor, instead of the more conventional cobalt catalyst in fixed beds.

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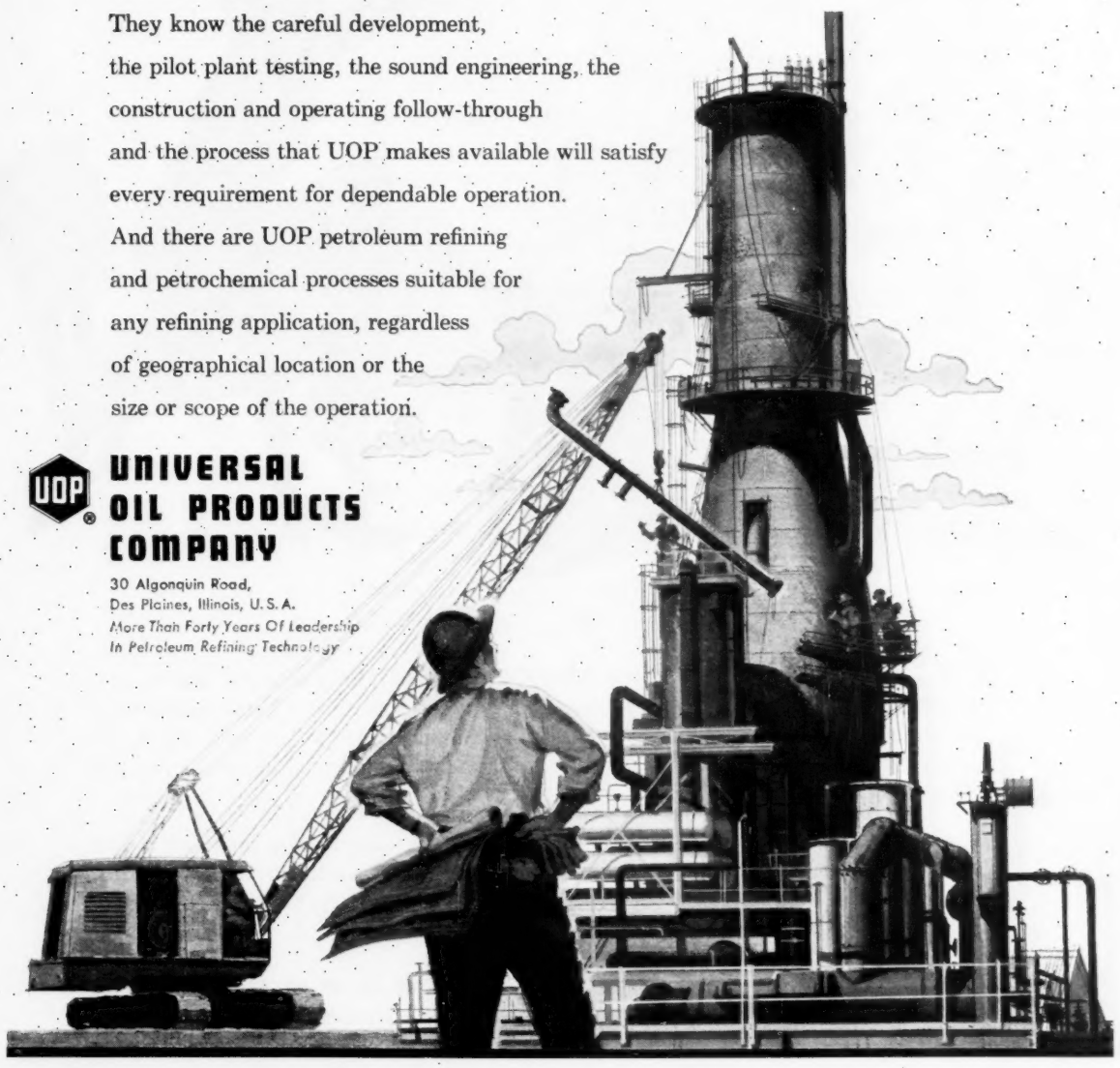

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# Market Newsletter

CHEMICAL WEEK
September 6, 1958

**Two new acrylonitrile capacity boosts** are giving total U.S. acrylo capacity a healthy push toward the 300 million lbs./year expected by the end of '58 (*CW, July 20, '57, p. 88*).

Union Carbide has just doubled capacity at Institute, W. Va. Spokesmen for the firm won't say precisely how much acrylonitrile the plant can now turn out, but *CW*'s estimate last year—now confirmed by industry experts—puts Carbide's post-expansion acrylo capacity at some 70 million lbs./year.

And within the next week or two American Cyanamid's capacity-doubling will probably be completed. Cyanamid spokesmen—less secretive than their competitors—say the plant's total capacity is 100 million lbs./year.

U.S. output of acrylonitrile is even harder to pin down, but will probably run between 170-176 million lbs. this year (*CW, April 19, p. 99*). The sizable margin between total U.S. capacity and actual output points up the industry's well-established practice of building for the future—a future that looks very bright to acrylonitrile producers because a major outlet for the chemical is the fast-growing synthetic fiber industry.

•

**No more reduced price on pentaerythritol.** The low tags buyers have enjoyed since last spring (*CW Market Newsletter, March 15*) were stripped off last week by Heyden Newport. Price increases posted, ranging from ½¢ to 4¢/lb. and effective Aug. 28, are attributed to climbing production costs.

Current quotes: mono pentaerythritol is up by ½¢, to 30¢/lb. in car- and truckloads. A similar increase puts less-than-carload prices to 31¢/lb. Increases of 4¢/lb. boost cost of the di- and tri- materials to 39¢/lb. in 50-lb. bags, to 38¢/lb. in car- and truckloads. Powdered technical pentaerythritol was increased 2¢/lb., to 31.5¢/lb. Price of regular technical material remains unchanged (29½¢/lb. in truckloads).

•

**New plants and products announced this week:**

• Commercial production of iminodiacetic acid by Dow Chemical. The difunctional acid can be used as an intermediate for making surface-active agents, complex salts, chelating agents.

• A new polyvinyl acetate emulsions plant put onstream by Manhattan Adhesives (Brooklyn, N. Y.). Products are tailored for adhesives manufacture.

• Expansion of boron carbide capacity by Carborundum, at Niagara Falls, N.Y. This important abrasive reportedly also shows useful semiconductor properties.

**Sales of detergents bounced back** during the second quarter of '58. The midyear total was within 1.3% of record sales established in the first half of '57, according to the Association of American Soap & Glycerine Producers.

The association's midyear survey shows that close to 1.97 billion lbs. of soaps and detergents were sold in the first half of '58—slightly less than the 1.99 billion lbs. sold in the same period of '57. Dollar sales, so far this year: $495.6 million, 3.9% more than in '57.

Sales of synthetic detergents (solids and liquids), which represent 72% of the total market, amounted to nearly 1.43 billion lbs., worth $349 million. Compared with '57, that's a 1.7% increase in tonnage, 7.8% in value. Sales of liquid synthetic detergents in '58 hit 202.3 million lbs.—25.2% more than in the first six months of '57.

Soap sales slumped to about 538.2 million lbs., worth $146.6 million; that's an 8.5% decline in volume, 4.4% in dollar value when compared with the first half of '57.

•

**Walking on the levee** may be a little different in the future. Plastic levees for rice fields that save labor and money will be shown this week at the University of California Rice Experiment Station, during U. of C. Rice Field Day. Advantages cited—release of 5% more land for crops, elimination of weeds on dirt levees—may appeal enough to growers to open a substantial new plastic market.

•

**A new oxygen-producing plant is in operation at U.S. Steel's** Gary Works. The unit will produce 94 million cu. ft./month (135 tons/day) of high-purity oxygen for operations such as cutting, scarfing and scrap preparations. The installation was built and will be maintained and operated for U.S. Steel by Linde, division of Union Carbide. It follows, by a week, the opening of a similar unit by Granite City Steel (*CW Market Newsletter, Aug. 23*).

Use of oxygen in steel production has soared from about 30 cu. ft./ton in 1930, to the current national average of some 200 cu. ft./ton.

**A new pricing policy for wood rosins** is posted by Hercules Powder's Naval Stores Department. Effective Oct. 1, prices of pale-grade rosins will be quoted firm for three months, subject to change on a quarterly basis. Prices for all grades will be announced in mid-September. Purpose: to eliminate daily fluctuating markets, simplify setting of prices of end products made from rosin.

**SELECTED PRICE CHANGES — WEEK ENDING SEPTEMBER 1, 1958**

| | Change | New Price |
|---|---|---|
| **UP** | | |
| Monopentaerythritol, c.l., t.l., | $0.005 | $0.30 |
| **DOWN** | | |
| Folic acid, U.S.P., bots., fib. dms., kilo-lots or more, gram | $0.22 | $0.48 |
| Copper metal, electrolytic, dlvd. Valley basis | 0.005 | 0.26 |

**All prices per pound unless quantity stated.**

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# Synthetic Organics Close the Book on '57

**The U.S. Tariff Commission's preliminary reports on '57 synthetic organic chemicals sales and production are now complete. It was, for makers of synthetic organics, a year that fit no single pattern: some segments made significant gains in production and/or sales; many others suffered equally significant setbacks (graph, opposite page).**

Seven categories were able to report gains in both production and sales in '57, as compared with '56. They are: medicinals, plastics and resins, plasticizers, surface-active agents, cyclic intermediates, flavors and perfumes, miscellaneous synthetics. Only medicinals and the plastics and resins categories made roughly comparable advances in both sales and output. In the remaining five categories, sales gains were appreciably smaller than production increases.

Two categories—dyes, and toners and lakes—felt severe declines in both output and sales. Although pesticide production dropped off considerably, this was countered by a comparably greater pickup in sales. On the other hand, production increases of elastomers and crude products from natural gas and petroleum were made in the face of declining sales.

**Plastics and Resin:** Total '57 domestic output of all synthetic plastics and resins (excluding cellulosics) was a little more than 4.3 billion lbs., or about 8.8% more than the near 4 billion lbs. reported for '56, says the Tariff Commission. (Some of the increase is due to inclusion of data from companies which did not report in '56.) Total sales climbed to 3.78 billion lbs. (worth $1.23 billion) from 3.46 billion lbs. sold in '56. Output of all cellulosic plastics last year amounted to 146 million lbs.—one million pounds less than in '56.

It was a good year for vinyl and vinyl copolymer resins; they continued to hold top-volume position, with an output of 887 million lbs. This was significantly more than the 760 million lbs. produced in '56. About half of the reported increase in '57 may be accounted for by production of companies not previously included in Tariff reports. Total vinyl resin sales of 797 million lbs. were valued at $267 million.

Polyethylene resins production, easily pushed styrene resins out of the second-place position. Poly production amounted to 708 million lbs., and sales were 662 million lbs., valued at $215 million. Styrene resins ranked third in volume of production in '57; 673 million lbs. were turned out.

Output of phenolic and other tar acid resins in '57 amounted to 532 million lbs.; it was 563 million in '56. Production of urea and melamine resins in '57 totaled 349 million lbs., of which 321 million lbs. were sold for $98 million.

**Plasticizers:** Along with the plastics, plasticizer production in '57 increased. Plasticizer gain was 5.9% to 442 million lbs.—a slightly greater increase than the 5.3% scored in '56 (compared with '55). Sales in '57 of those plasticizers covered by the Tariff report, amounted to 363 million lbs., valued at $114 million; this compares with 331 million lbs. (worth $106 million) sold in '56.

Production of cyclic plasticizers—principally esters of phthalic anhydride and phosphoric acid—amounted to 329 million lbs. or slightly more than the 315 million lbs. reported for '56. Sales in '57 totaled 265 million lbs. (worth $76 million), compared with 244 million lbs. (worth $73 million) in '56.

Production of acyclic plasticizers (esters of adipic, azelaic, oleic, phosphoric, sebacic, stearic, and other acids) hit 113 million lbs. in '57, roughly a 12% gain over the 101 million lbs. of '56. Sales volumes and dollar values for '57: 97 million lbs., worth $37 million; for '56, 88 million lbs., worth $34 million.

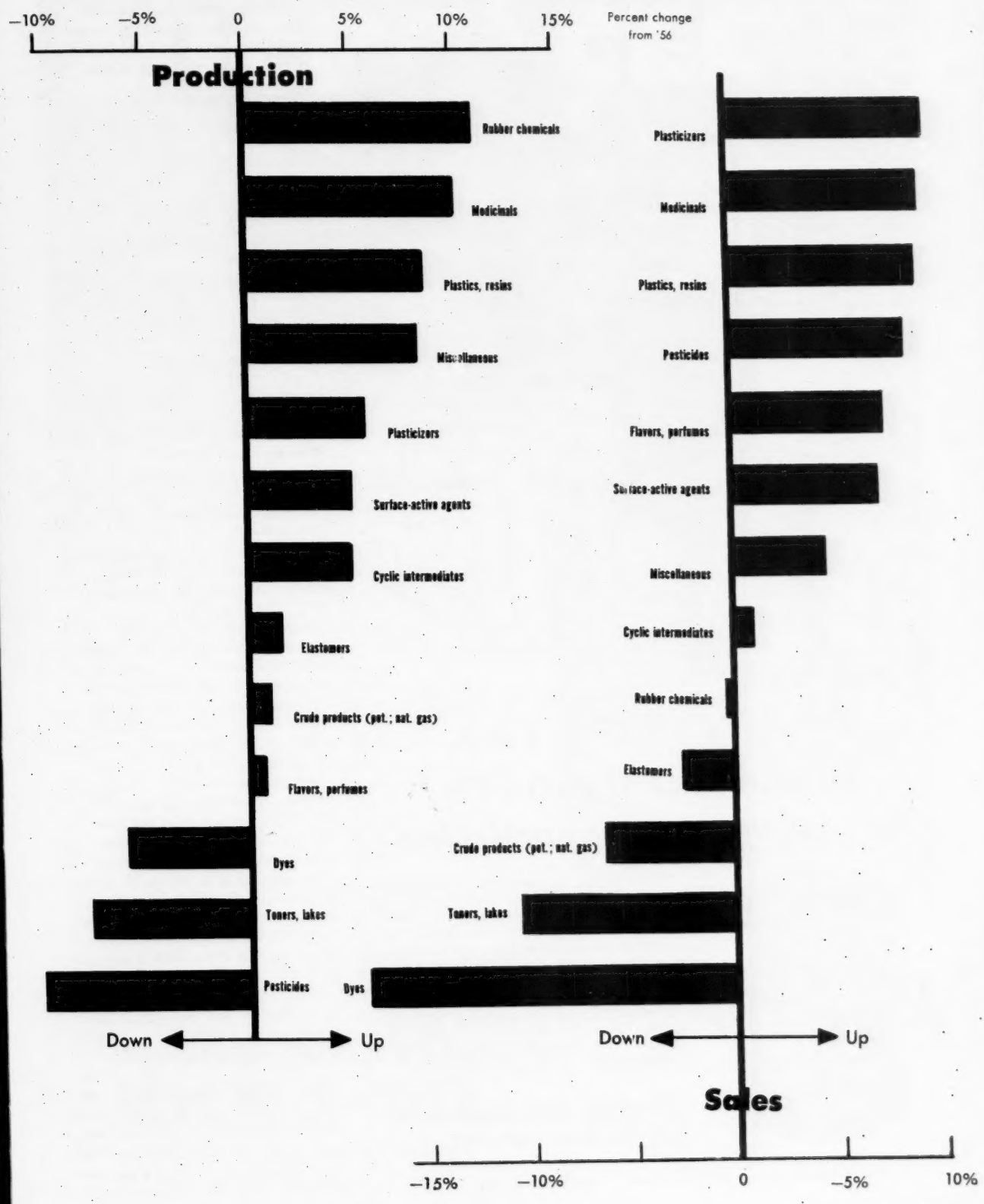
**Medicinals:** Total output of medicinals (in bulk) was 98.5 million lbs. in '57, according to the Tariff report. That's 10.2% more than the 89.4 million lbs. reported for '56. Sales in '57 totaled 79.9 million lbs. ($576 million); they were 73.1 million lbs. ($506 million) in '56. That's a 9.3% increase in quantity and 13.8% hike in value.

Antibiotics as a group were most important in terms of value. Sales in '57 amounted to 2 million lbs., worth $324 million—an increase of 17.6% over '56 in quantity and 19.6% in value. Production in '57 was 2.4 million lbs., or 20% more than the 2 million made in '56 (including all antibiotics for human and veterinary purposes). Output of antibiotics for animal feed supplements, food preservation, crop spraying was 870,000 lbs. in '57, 779,000 lbs. in '56.

Some 526 trillion International units of penicillin were produced in '57, of which 456 trillion units were sold for $66.3 million; in '56, 478 trillion units were made, 449 trillion sold for $63.5 million.

**Surface-Active Agents:** Total output of surface-active agents (excluding oil soluble petroleum sulfonates, which are grouped with miscellaneous cyclic chemicals) was just over 1.2 billion lbs. in '57, or 5% more than in '56. Sales volume was up 7.2%, to 1.12 billion lbs. ($217 million) from a near 1.05 billion lbs. ($208 million) in '56.

Production of cyclic surface-active agents in '57 amounted to 775 million lbs.—about 3% more than the 752 million lbs. made in '56. The dodecylbenzene sulfonic acid type was the most important product in this class. Cyclic sales ran up to 741 million lbs., worth about $119 million in '57, compared with 690 million


Percent change from '56
−10%
−5%
0
5%
10%
15%
Production
Rubber chemicals
Medicinals
Plastics, resins
Miscellaneous
Plasticizers
Surface-active agents
Cyclic intermediates
Elastomers
Crude products (pet.; nat. gas)
Flavors, perfumes
Dyes
Toners, lakes
Pesticides
Down
Up
Plasticizers
Medicinals
Plastics, resins
Pesticides
Flavors, perfumes
Surface-active agents
Miscellaneous
Cyclic intermediates
Rubber chemicals
Elastomers
Crude products (pet.; nat. gas)
Toners, lakes
Dyes
Down
Up
Sales
−15%
−10%
0
−5%
10%

lbs., worth $110 million, in '56.

Acyclic surface-active agents did better than in '56 when a decline in production was reported. Output in '57 amounted to 431 million lbs., or about 9% more than the 396 million reported in '56. Sulfated and sulfonated acyclic compounds represented more than half the total output; alcohols and esters were most important products. Sales of acyclic surfactants climbed to 382 million lbs., worth $98 million, in '57, from 357 million lbs. valued at—significantly—the same amount.

**Flavor, Perfume Materials:** Total output of flavor and perfume materials was 45 million lbs. in '57, or about the same (up only 0.8%) as in '56. Sales amounted to 42 million lbs. valued at $59 million in '57, compared with 39 million lbs. valued at $55 million in '56.

Production of cyclic flavor and perfume materials continued to increase, climbed to 27 million lbs. or 8% more than the 25 million made in '56. Sales, too, made gains—to 22 million lbs. ($36 million) from 21 million lbs. ($33 million) in '56. (Important products in this group include methyl salicylate, terpineols, and phenethyl alcohol.)

Reported for the first time in preliminary Tariff reports are synthetic sweeteners: production of these chemicals—which include derivatives of cyclohexane-sulfamic acid and saccharin—totaled 2 million lbs; sales of 2 million lbs. were valued at almost $4 million.

Production of acyclic flavor and perfume materials in '57 amounted to 18 million lbs., or 5% less than the 19 million made in '56. By far the most important acyclic was monosodium glutamate, of which 17 million lbs. were made. Sales volume of the group as a whole was 20 million lbs. (18 million lbs. in '56), valued at $23 million ($1 million more than in '56).

**Cyclic Intermediates:** Small gains in production and sales were made by the cyclic intermediates category —output climbing 5% higher to over 6.9 billion lbs. About 66% of the '57 output was consumed by the producing firms in captive manufacture —the remainder was sold, and sales increased 1% to 2.58 billion lbs. Dollar values of sales increased from $444 million in '56 to $447 million in '57.

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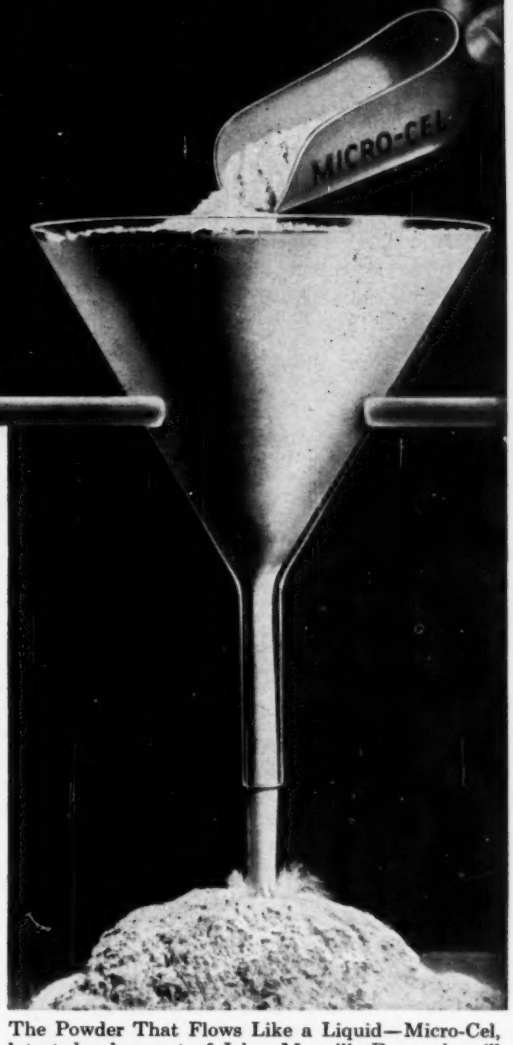
- to reduce surface sheen

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## MARKETS

Output of many individual intermediates in '57 remained almost up to the '56 levels. Again in '57, production of two largest-volume intermediates exceeded the billion-lbs. mark. Nearly 1.17 billion lbs. of styrene were made, representing a less than 1% decrease from '56. Production of ethylbenzene decreased 0.5% to somewhat more than 1.16 billion lbs.

Percentage production increases chalked up by other intermediates included: cyclohexane, up 73%; bisphenol A, 47%; alpha-methylstyrene, 26%; alpha-chlorotoluene, 18%; p-dichlorobenzene, 15%; phthalic anhydride, 13%; cyclohexanol, 10%.

But the production of other intermediates slipped in '57—e.g., refined cresylic acid, down 19%; chlorobenzene, 17%; refined naphthalene, 11%; aniline, 9%; and dodecylbenzene, 6%. (Production of naphthalene, aniline, nitrobenzene, and phthalic anhydride also declined in '56, compared with '55.)

**Dyes Take a Drubbing:** The poorest showing of all categories was by dyes, whose domestic output of 143 million lbs. in '57 was 6% less than the 152 million lbs. in '56—of dubious consolation is the fact that this decline was smaller than the 9.5% drop recorded in '56.

Sales of dyes fared far worse. The 127 million lbs. sold (earning $164 million) was a whopping 18% less than the 155 million lbs. (worth $185 million) sold in '56. The decline in dollar values figured out to 11%.

Production and sales of dyes grouped by Color Index number showed greatest decreases. Production of Color Index dyes was 99 million lbs. in '57, compared with 109 million in '56—a 9% decline. Sales of these materials totaled 88 million lbs. in '57, considerably less than the 112 million lbs. sold in '56; dollar values declined to $85 million from $99 million, a 14% drop in value compared with the 21% decrease in quantity sold.

On the other hand, output of prototype dyes in '57 was 29 million lbs. or 4% more than the 28 million turned out in '56. Sales, however, were down in both quantity and dollar value: 25 million lbs. and $44 million in '57, 28 million lbs. and $51 million in '56.

Production of ungrouped dyes totaled 15 million lbs. in both '56 and '57, but sales dropped to 13 million lbs. ($35 million) in '57 from 15 million lbs. ($36 million) in '56.

Some of the big production declines reported for individual dyes included: synthetic indigo, down 14%; Algol Yellow GC, 37%; Orange II, 30%; anthraquinone vat jade green, 28%; anthraquinone vat brown R, 22%.

Production of some important dyes, however, increased in '57, compared with '56. Some examples: chrome blue black R, up 108%; indanthrene brown BR, 39%; anthraquinone vat green B and black B, up 37%.

Four chemical classes of dyes accounted for 77% of the total quantity of dyes produced. Azo dyes accounted for 35% of the total (34% in '56), anthraquinone vat dyes, 19% (same as in '56), sulfur dyes, 16% (21% in '56), and indigoid and thioindigoid dyes, 7% (8% in '56). Production of sulfur dyes declined 30% in '57, compared with '56. Other declines were: indigoid and thioindigoid, down 21%, anthraquinone vat dyes, down 8%, and azo dyes, down 1%.

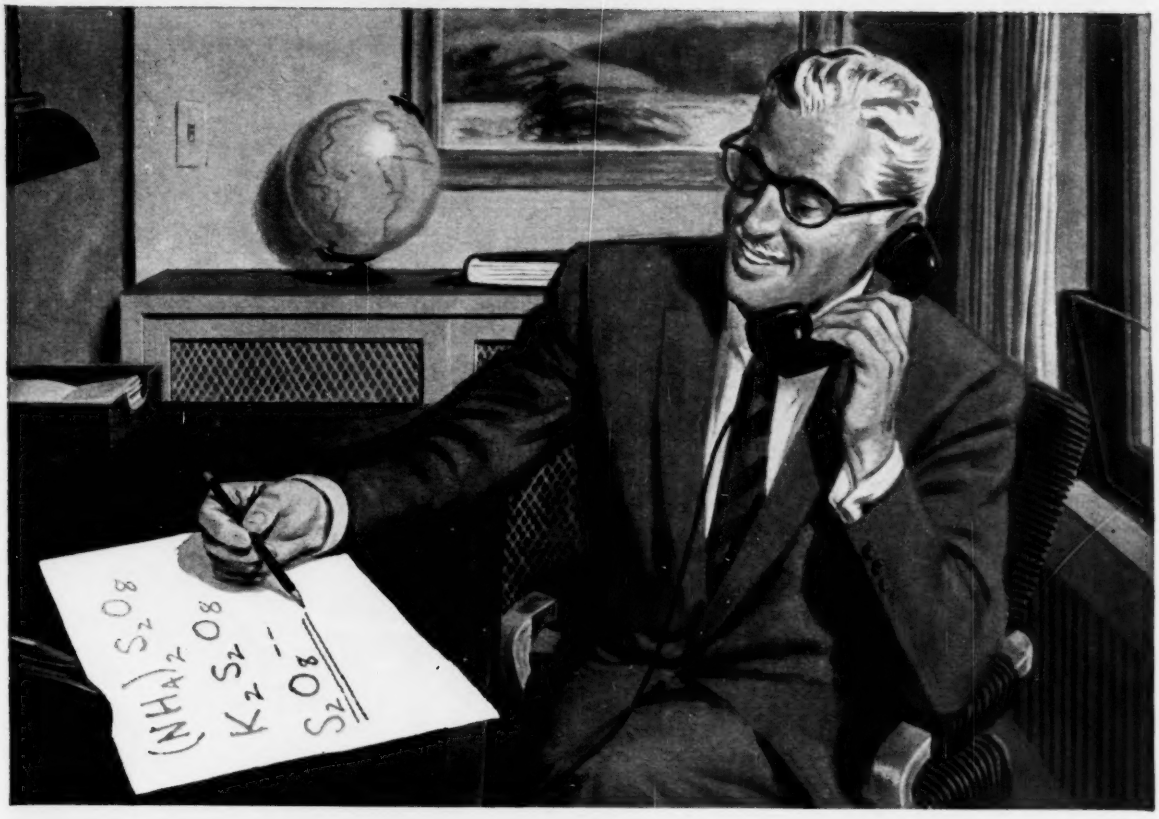
**Toners and Lakes:** According to the Tariff report, production of full-strength toners and lakes in '57 continued the decline which began in '56. Output in '57 was 37.8 million lbs. or 7.8% less than the 41.0 million reported for '56—in fact, the lowest record since '49.

Sales of toners and lakes also declined, though relatively little compared with the production slump. In '57, 29.6 million lbs. were sold for $56.9 million, compared with 33.1 million lbs. sold for $57.8 million in '56. That represents a 10.6% decrease in quantity, 1.6% in value.

Output of full-strength toners was 27.8 million lbs. in '57—2.5% less than the 28.5 million in '56. Sales declined 5.8% in poundage, but increased 3.1% in value: 21.1 million lbs. and $47.1 million in '57, compared with 22.4 million lbs. and $45.7 million in '56.

Total production, in '57, of extended toners and lakes amounted to 10 million lbs., of which 5.5 million lbs. were extended toners. 4.5 million were lakes. Total production of these materials, in '56, was 12.5 million lbs.

**Pesticides:** Output of all pesticides and other organic agricultural chemicals slumped 10%, from 570 million lbs. in '56 to 512 million in '57. This was in striking contrast to the 13%




# Where can you use the unique characteristics of persulfates?

All peroxygens carry active oxygen in their molecules, but the persulfates offer these special properties as well: Unusually high oxidation potential, good resistance to catalytic decomposition, and a reactive anion that gives reactions quite different from those of other peroxide compounds.

You'll find persulfates have particular values in processes involving emulsion polymerization of monomers and depolymerization of organic polymers. Persulfates excel in such applications as processing color films, etching printing plates, and modifying starches; and are of interest as reactive oxidizing agents for many other purposes.

Perhaps *your* processing techniques can be improved through the use of Becco Persulfates. A Becco field engineer will be glad to discuss this with you, at no obligation . . . drop us a line. At the same time, ask for your free copy of these booklets:

Nos. 34 and 68, "Uses or Persulfates"

No. 63, "Action of Persulfates on 1, 2-Glycols"

No. 90, "Etching of Printed Circuits with Ammonium Persulfate"

**BECCO CHEMICAL DIVISION**
Food Machinery and Chemical Corporation
Station B, Buffalo 7, New York

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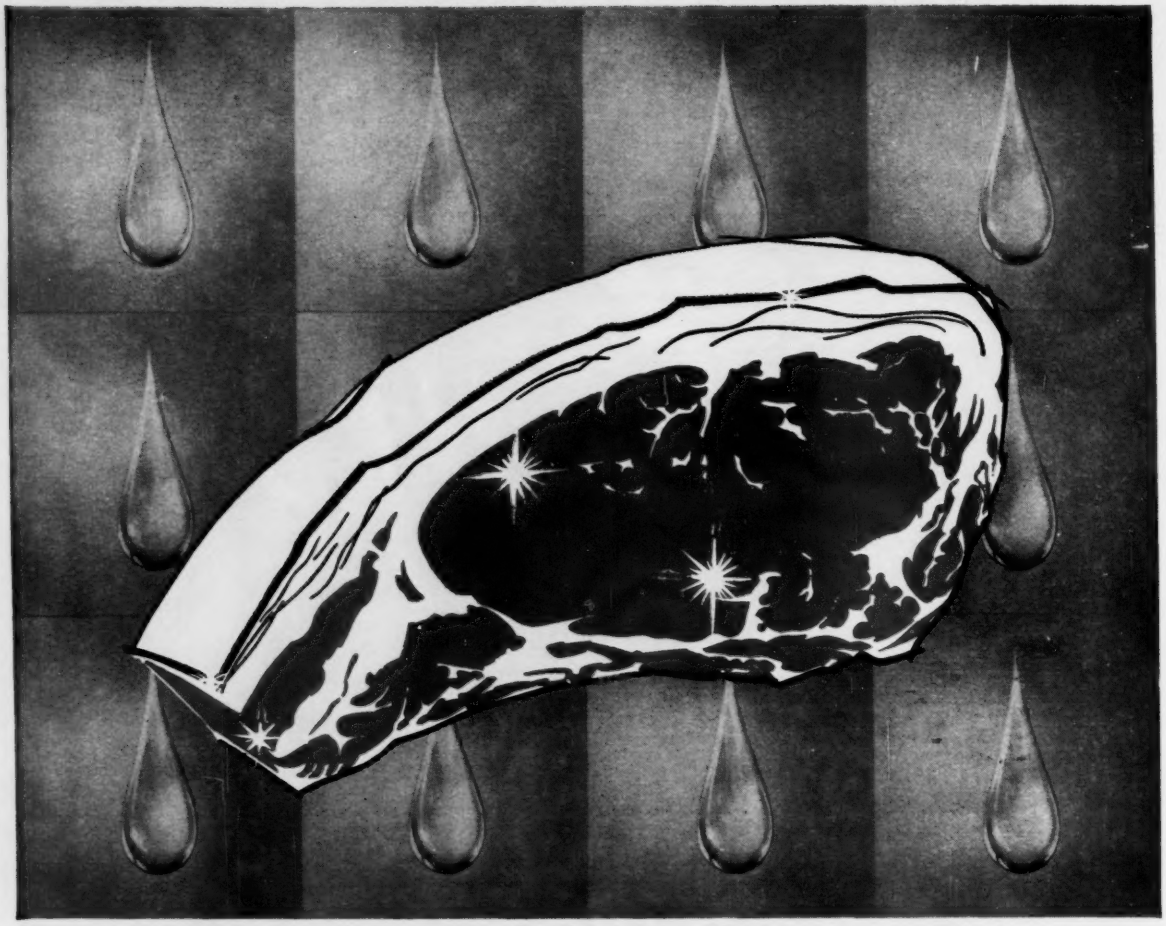

# A "liquid dip" for wrapping meat

A more attractive way of packaging frozen meat is now being tested. It's an all-around airtight wrap that seals in fresh red color that's ordinarily lost after freezing. The process is simple: An initial immersion in an ethyl cellulose base hot melt followed by a liquid dip in the insulating coating of which one of the ingredients is glycerine. The glycerine acts as a plasticizer and humectant. It helps keep the package clear and prevent slip.

Another approach is described in a recent Belgian patent. This time a dip of hot 60-80% Glycerine solution heat-seals polyethylene into an airtight film around the meat.

Ideas like these can be extended throughout the whole world of packaging. They're examples of the many things to come with Glycerine. And more, the unique balance of properties that won such wide acceptance for Glycerine in the past will surely continue to open new doors to chemical progress.

We'd like to send you our 18-page booklet: "Glycerine Properties and Uses." Address your request to the Glycerine Producers' Association.

**Properties**

HYGROSCOPICITY • STABILITY

SOLVENT POWER • VISCOSITY

NONVOLATILITY • NONTOXICITY

TASTE • COMBINING WEIGHT


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ANTI-FREEZE • ALKYD BASE

GLYCERINE PRODUCERS' ASSOCIATION • 295 MADISON AVENUE, NEW YORK 17, N. Y.

production jump scored in '56. Sales volume, however, increased in '57 to 433 million lbs. valued at $178 million—an 8.5% increase from the 399 million lbs., worth $173 million, sold in '56.

The production decrease was due primarily to lower output of cyclic pesticides and other cyclic chemicals which totaled about 407 million lbs. in '57, compared with 474 million lbs. in '56—a drop of 14%. Sales, though, were up: 340 million lbs., valued at $132 million, in '57; 343 million lbs., valued at $135 million, in '56. The chemical in this group produced in greatest quantity was DDT—125 million lbs. made in '57 (138 million lbs. in '56).

Production of acyclic pesticides and other acyclic organic agricultural chemicals increased to 104 million lbs. in '57, from 96 million lbs. in '56. Sales volumes, too, moved up, far more so than did sales value. Sold in '57 were 94 million lbs., worth $46 million; in '56, the values were 57 million lbs., worth $38 million. The pesticides report, says the Tariff Commission, is more than 95% complete.

**Rubber-Processing Chemicals:** Paradoxical though it seems, production of rubber-processing chemicals in '57 didn't reflect cutbacks in auto production; output of these chemicals increased to 186 million lbs., or 11% more than the 167 million produced in '56. Sales, however, stood at the same volume as in '56—132 million lbs.—but dollar values climbed to $84 million, or $4 million more than in '56.

Production of cyclic rubber-processing chemicals (used chiefly as accelerators and anti-oxidants) totaled 156 million lbs., compared with 141 million lbs. in '56. Sales dropped to 110 million lbs., valued at $70 million, from 111 million lbs. valued at $67 million in '56.

Output of acyclic rubber-processing chemicals (chiefly accelerators and peptizers) amounted to 30 million lbs. in '57—4 million lbs. more than in '56. Sales figures for the respective years: 22 million lbs., worth $14 million, and 21 million lbs., worth $13 million.

**Elastomers:** Total domestic output of all types of synthetic elastomers increased 1.7% to somewhat more than 2.35 million lbs., while sales declined some 2.6% to a near 2.1 bil-

lion lbs. Value of material sold in '57 was $577 million, compared with $588 million in '56.

Cyclic elastomers made in '57 consisted mainly of polybutadiene-styrene type (S-type) materials, amounted to 1.85 billion lbs., compared with 1.8 billion in '56. Sales were down to 1.62 billion lbs., valued at $390 million, from 1.68 billion lbs., worth $403 million in '56.

Production of acyclic elastomers —including neoprene, butyl, N-type, silicone—amounted to 504 million lbs. in '57, or about 2 million less than in the preceding year. Sales of 479 million lbs. and dollar values of $187 million reflected increases of 3 million lbs. and $2 million, respectively.

**Miscellaneous Synthetics:** Total output of miscellaneous chemicals in '57 was 27.3 billion lbs., or 8.3% more than the 25.2 billion lbs. turned out in '56. Sales in '57 totaled 10.9 billion lbs., valued at $1.7 billion, compared with 10.4 billion lbs. valued at $1.6 billion in '56.

The '57 output of the more important cyclics in this group: lubricating oil additives, 400 million lbs.; tanning materials, 36 million lbs.; hexamethylenetetramine, 23 million lbs.; naphthenic acid salts, 21 million lbs.

Total output of miscellaneous acyclics in '57 was 26.5 billion lbs., compared with 24.6 billion lbs. in '56. Sales were 10.4 billion lbs. ($1.5 billion) in '57, 9.9 billion lbs. ($1.4 billion) in '56.

Chemicals whose outputs exceeded 1 billion lbs. in '57: synthetic methanol, 1.5 billion lbs.; 37% formaldehyde and ethyl alcohol, each 1.4 billion lbs.; and ethylene oxide, ethylene glycol, isopropyl alcohol, and acetic anhydride, each 1.2 billion lbs.

**Crudes:** Total output of crude products from petroleum and natural gas was the largest on record—more than 18 billion lbs. in '57 or about 1% more than in '56. Sales were 10.33 billion lbs., valued at $376 million, representing a decline of 6.3% from the approximately 11 billion lbs. produced in '56.

Production of all aromatic and naphthenic compounds amounted to near 3.57 billion lbs. in '57.

Output of benzene (1 and 2 degree) from petroleum was 852 million lbs. last year, or 4% more than in '56. Production of toluene was

up, too, to more than 1.12 billion lbs. in '57, from 947 million in '56. Output of xylene decreased to 830 million lbs., from 895 million in '56.

Production of aliphatic hydrocarbons inched higher, to more than 14.5 billion lbs., from somewhat more than 14.4 billion in '56. Sales slipped, however, to 7.9 billion lbs., valued at $289 million, from 8.5 billion lbs., valued at $288 million, in '56.

Output of ethylene crept close to the 4 billion lbs. mark from the 3.6 billion made in '56. Production of propane, too, was up—to 2.46 billion lbs. in '57, from 2.18 billion in the preceding year. Some 1.5 billion lbs. of propylene were made in '57, compared with 1.4 billion in '56. Production of butadiene was 1.54 billion lbs., or slightly more than the 1.5 billion turned out in '56.

**Tar and Tar Crudes:** Domestic output of all tars (coal tar, water-gas tar, and oil-gas tar) amounted to 916 million gallons in '57—a near 4% more than the 881 million gallons reported for '56.

Production of industrial and specification grade benzene (including that produced from petroleum and imported crude materials) amounted to 332 million gallons in '57, compared with 337 million gallons in '56. Sales of such benzene in '57 amounted to 277 million gallons, valued at $98 million. That's a decline from the 284 million gallons, valued at $103 million, sold in '56.

Production of toluene (including material produced from petroleum for use in aviation fuel) amounted to 198 million gallons—up 13.8% from the 174 million gallons reported for '56. Output of xylene in '57 (including that produced for blending in motor fuel) amounted to 127 million gallons. Production of crude naphthalene in '57 was 420 million lbs., compared with 491 million lbs. in '56.

Production of creosote oil in '57 was 127 million gallons, down from the 132 million gallons in '56. The output of road tar was 95 million gallons—slightly more than the 92 million gallons reported for '56.

Although the Tariff Commission statistics on the various categories of synthetic organics are labelled "preliminary," much of the data is virtually complete, will show little change when the commission's final report is published later this year.

# You can depend on plasticizers made from CARBIDE'S 2-Ethylhexanol

Manufacturers of plasticizers—such as di-2-ethylhexyl phthalate, di-2-ethylhexyl adipate, di-2-ethylhexyl sebacate, di-2-ethylhexyl azelate, and phosphates—know from years of experience that they can depend on CARBIDE as a constant source of top-grade 2-ethylhexanol.

Extremely low colored esters can be made with CARBIDE's 2-ethylhexanol—this means lower production costs. Reason—new specifications ensure minimum carbonyl content.

In addition, plasticizers made from CARBIDE's 2-ethylhexanol, offer excellent compatibility with vinyl chloride resins . . . good stability . . . low volatility . . . flexibility at low temperatures . . . and resistance to extraction by oil and water.

Find out how you too can profit with 2-ethylhexanol from CARBIDE. Get in touch with your local CARBIDE Technical Representative, or write Union Carbide Chemicals Company, Division of Union Carbide Corporation, Room 328, Dept. H, 30 East 42nd Street, New York 17, New York.

**UNION CARBIDE CHEMICALS COMPANY**

DIVISION OF UNION CARBIDE CORPORATION

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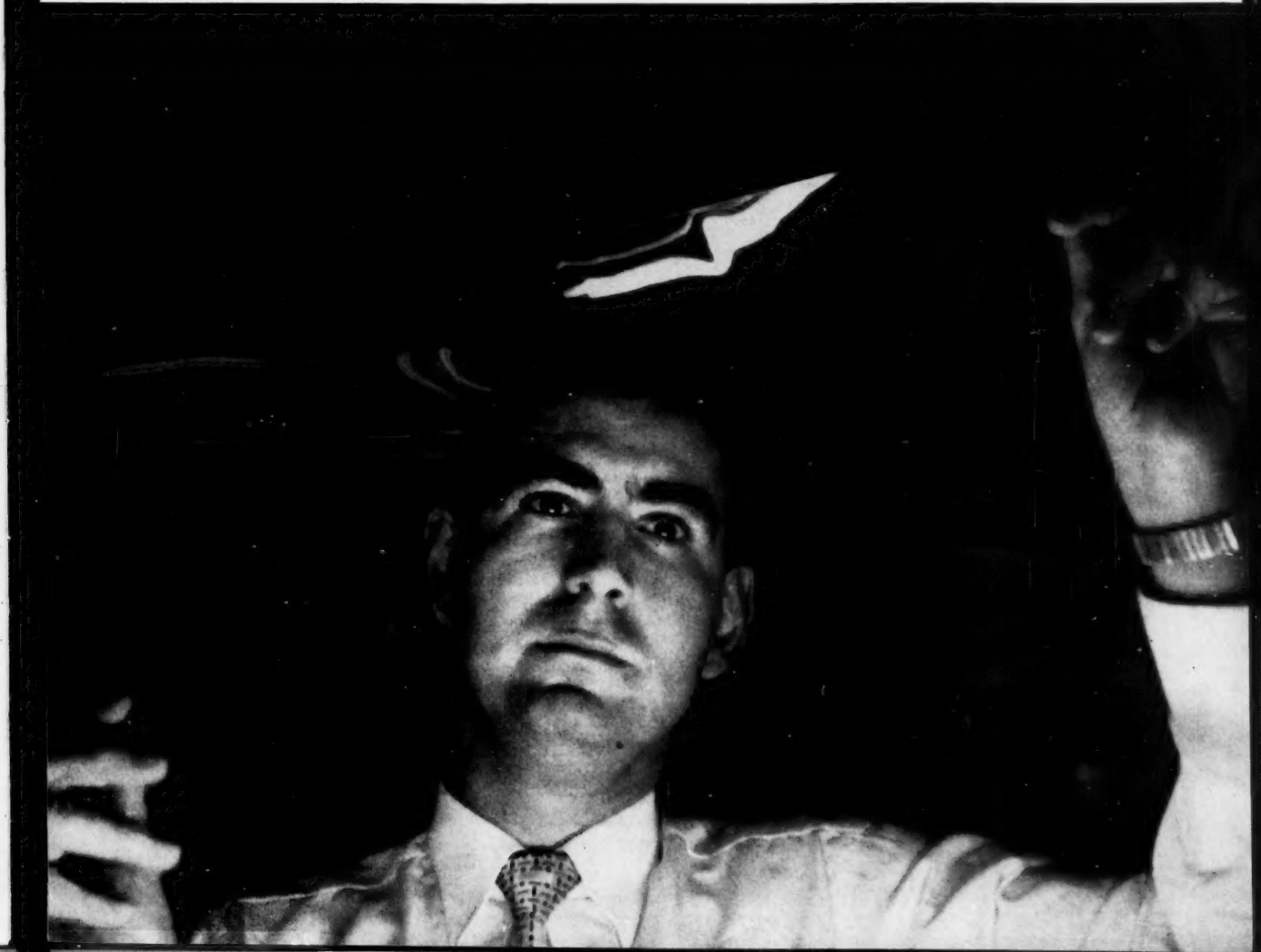

# THE TANK CAR NEWS OF 1958


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KANIGEN, a unique patented process, deposits a hard, uniform, corrosion-resistant nickel-alloy coating on tank car interiors . . . lasts four to six times as long as phenolic, epoxy or neoprene linings. You can load at high temperatures that would destroy other linings. For example, 73% caustic soda can be piped in at unlimited temperatures.

Tank cars lined with KANIGEN are also being successfully used for liquids such as tetraethyl lead, ethylene oxide and glucose.

If your product is a liquid, GATX furnishes or can build a tank car to transport it. GATX maintains a nation-wide network of shops for servicing.

No capital investment . . . when you ship GATX.

*KANIGEN is a trademark which identifies chemical nickel coating by GENERAL AMERICAN TRANSPORTATION CORPORATION and its licensees, the product resulting therefrom and compositions produced by them for use in chemical nickel coatings.*

GATX GENERAL AMERICA TRADE MARK

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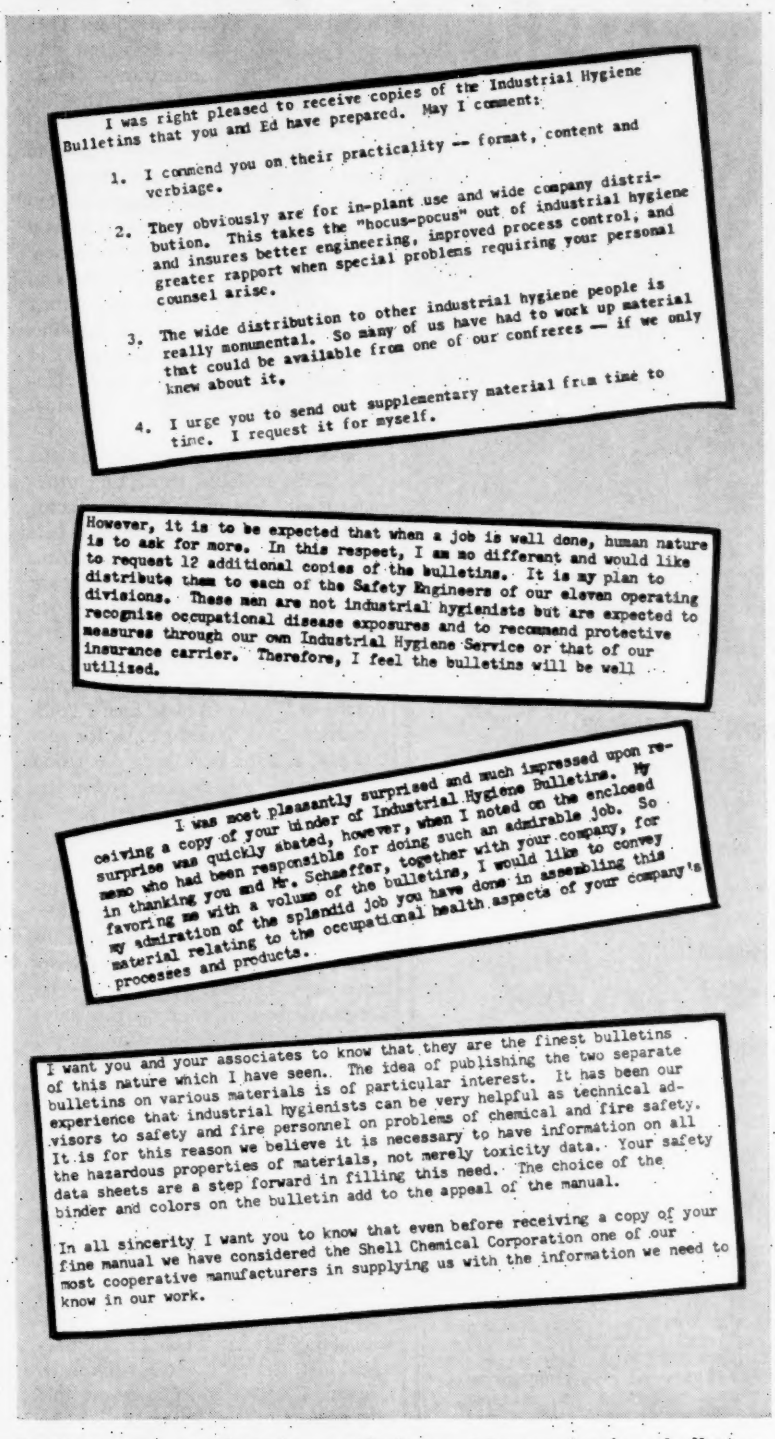
# Toxicity Data: Wide-Open Policy Pays Off



I was right pleased to receive copies of the Industrial Hygiene Bulletins that you and Ed have prepared. May I comment:

1. I commend you on their practicality -- format, content and verbiage.

2. They obviously are for in-plant use and wide company distribution. This takes the "hocus-pocus" out of industrial hygiene and insures better engineering, improved process control, and greater rapport when special problems requiring your personal counsel arise.

3. The wide distribution to other industrial hygiene people is really monumental. So many of us have had to work up material that could be available from one of our confreres -- if we only knew about it.

4. I urge you to send out supplementary material from time to time. I request it for myself.

However, it is to be expected that when a job is well done, human nature is to ask for more. In this respect, I am no different and would like to request 12 additional copies of the bulletins. It is my plan to distribute them to each of the Safety Engineers of our eleven operating divisions. These men are not industrial hygienists but are expected to recognize occupational disease exposures and to recommend protective measures through our own Industrial Hygiene Service or that of our insurance carrier. Therefore, I feel the bulletins will be well utilized.

I was most pleasantly surprised and much impressed upon receiving a copy of your binder of Industrial Hygiene Bulletins. My surprise was quickly abated, however, when I noted on the enclosed memo who had been responsible for doing such an admirable job. So in thanking you and Mr. Schaeffer, together with your company, for favoring me with a volume of the bulletins, I would like to convey my admiration of the splendid job you have done in assembling this material relating to the occupational health aspects of your company's processes and products.

I want you and your associates to know that they are the finest bulletins of this nature which I have seen. The idea of publishing the two separate bulletins on various materials is of particular interest. It has been our experience that industrial hygienists can be very helpful as technical advisors to safety and fire personnel on problems of chemical and fire safety. It is for this reason we believe it is necessary to have information on all the hazardous properties of materials, not merely toxicity data. Your safety data sheets are a step forward in filling this need. The choice of the binder and colors on the bulletin add to the appeal of the manual.

In all sincerity I want you to know that even before receiving a copy of your fine manual we have considered the Shell Chemical Corporation one of our most cooperative manufacturers in supplying us with the information we need to know in our work.

**Typical comments that show wide interest in new hygiene bulletins.**

**In just a few weeks, Shell Chemical will complete the wide distribution of 18 additions to its new series of industrial hygiene bulletins about the toxicity of its products. The distribution is a follow-up to an earlier mailing that produced an unexpectedly large response, answered an industry problem of long standing and gave Shell a bonus in customer goodwill.**

The initial distribution, some months ago, to nearly 500 industrial hygienists, toxicologists, physicians and technical personnel elicited over 160 favorable comments. This indicated that Shell was on the right track in solving the problem of how to distribute toxicological information.

Most chemical producers evaluate the toxic properties of their products. These evaluations, however, are usually made available only to customers requesting such information. Shell, besides undertaking an unsolicited distribution, is also making another departure from standard practice. Hygiene bulletins are now sent out, with product samples, as a matter of routine. And district offices also have supplies of the literature readily available.

The response to Shell's first mailing isn't the only indication that there's a need for wider dissemination of toxicity data. Next February, Academic Press will launch a new bimonthly scientific journal, "Toxicology and Applied Pharmacology." A large portion of its coverage will include toxicity studies of chemicals, drugs and other formulations—information that because of its rather routine nature usually isn't published in other journals.

**Telling it Twice:** Shell hygiene bulletins consist essentially of two sets of brochures, one technical, the other nontechnical. The technical toxicity data sheets are similar to those put out by several firms, presenting physical data, sensory perception limits, detailed technical descriptions of experiments on laboratory animals and, in some cases, suggested medical treatment. The safety data sheets, believes Shell, are somewhat of an innovation. They are much less tech-

nically written and are aimed at interpreting test results for the chemist, operator, or layman.

Thus, the safety sheets for ally alcohol show a "sensory response" table that describes human response to various vapor concentrations. They also tell how much compound produces various concentration levels under specified conditions. This expands the value of the traditional "threshold limit"—usually stated in hard-to-evaluate parts per million.

Norman White, Shell's industrial hygiene manager terms the new bulletin program an attempt at mass education of the industrial public in the safe use of hazardous chemicals. Broad distribution helps place the bulletins where they will do the most good at the time they are most needed, eliminating the need for costly individual mailings.

**Sales Aid:** Also important is the role of the bulletins in making product toxicity less of a negative factor in marketing. Toxicity is a subject that many salesmen shy away from. And if adequate data is lacking, it's only natural for a potential customer to have questions.

The bulletins, therefore, suggest safety precautions that help counter purchasers' fears of workmen's compensation cases, union claims for special pay, and the like. Open discussion of a product's hazardous properties, says White, has helped cap many a sale.

**Industry Agreement:** Other chemical producers also believe that candidness about toxicity is desirable. Dow, for example, considers toxicity information "of paramount importance" in sales development work. The company distributes (on request only) three types of toxicity data sheets. One set, highly technical, is aimed at the toxicologist, industrial hygienist and physician. A second type summarizes the hazards of using a chemical and presents precautions for its safe handling. This sheet is edited primarily for plant operating personnel. The third type outlines toxic properties and suggests first-aid steps.

American Cyanamid relies on its catalogs to present toxicity data. Product catalogs present a concise but thorough discussion of toxicity hazards. Cyanamid hopes to supplement this information by publishing its studies in the new coming toxicology journal.

Hydrofluoric Acid

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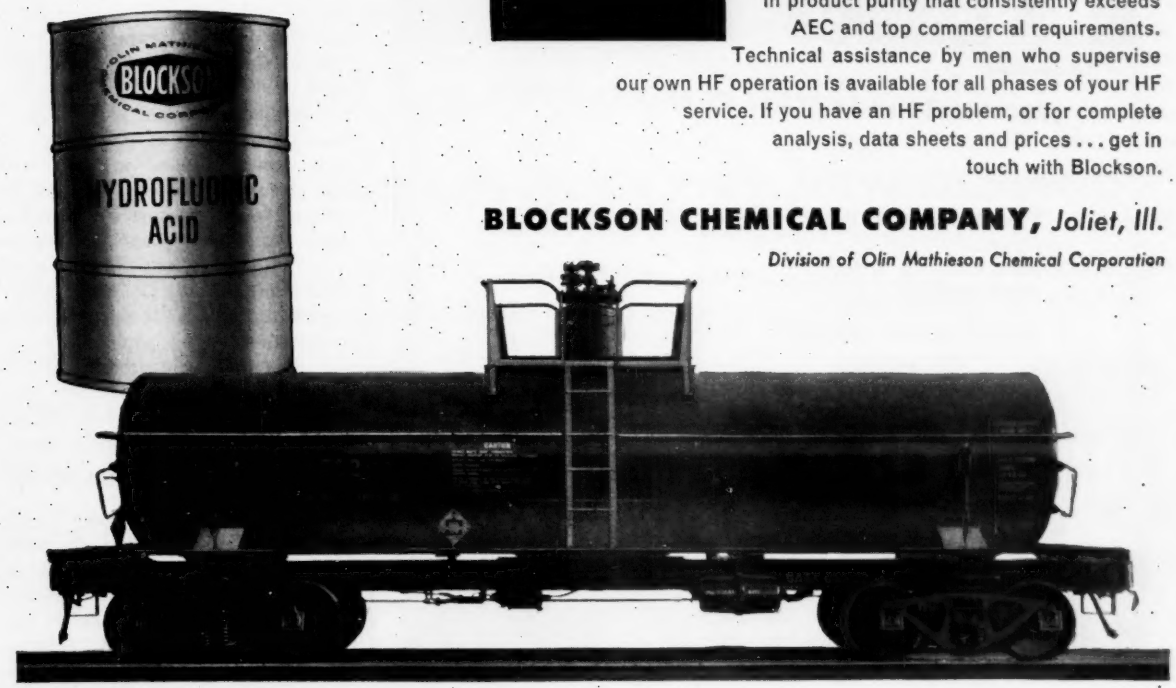
*Aqueous, Min. 70.0% HF*

## For dependable HF service depend on Blockson

To HYDROFLUORIC ACID buyers, Blockson provides the capacity for steady, dependable QUANTITY shipment. Blockson quality control results in product purity that consistently exceeds AEC and top commercial requirements. Technical assistance by men who supervise our own HF operation is available for all phases of your HF service. If you have an HF problem, or for complete analysis, data sheets and prices . . . get in touch with Blockson.




**BLOCKSON CHEMICAL COMPANY,** *Joliet, Ill.*

*Division of Olin Mathieson Chemical Corporation*

## SALES

Union Carbide Chemical's approach to toxicity data distribution takes the form of "Toxicity Study Sheets" on specific compounds and toxicity charts in product-line catalogs. The study sheets are concentrated summaries of laboratory tests.

Union Carbide supports an extensive toxicological research program at Mellon Institute. Dow, Cyanamid and Du Pont also maintain laboratories. Many producers, such as Shell, have outside consulting laboratories check their products for toxicity.

Many industrial hygienists feel that the trend to more extensive toxicological research is a healthy step. And it is evident, too, that many producers are taking a liberal attitude toward dissemination of such data. It may never be possible to gauge exactly the hazards eliminated or the sales made by the number of data sheets sent out. But Shell's program is successful enough to call for its continuation.

## DATA DIGEST

• **Organic chemicals:** New catalog tabulates technical data and typical applications for Armour Chemicals' line of fatty acids, primary, secondary and tertiary amines, diamines and diamine salts, quaternary ammonium chlorides, aliphatic amides and nitriles, cationic and nonionic surface-active agents, fuel oil additives and anti-stripping agents. Armour Chemical Division (1355 West 31st St., Chicago).

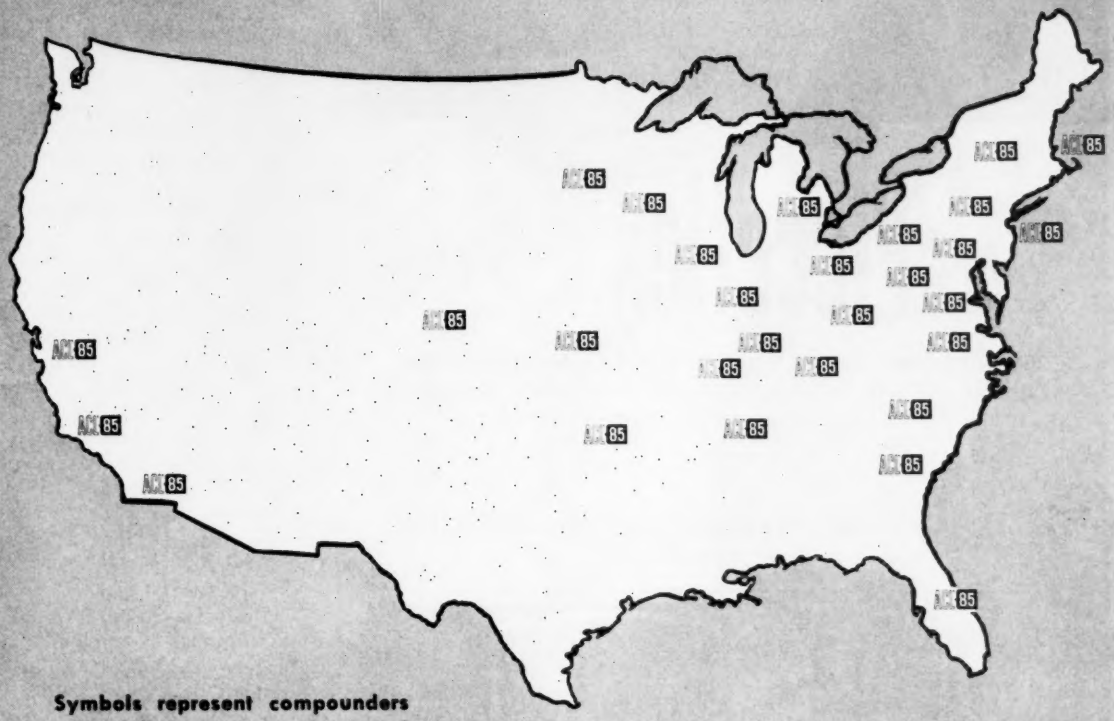
• **Radiation-resistant fluids:** Chart gives physical data on polyphenyl, its alkyl derivatives and mixtures that may be suitable for use as coolants in nuclear power reactors or as radiation-resistant impregnants for capacitors. Organic Chemicals Division, Monsanto Chemical Co. (St. Louis).

• **Solvents:** 8-p. booklet provides specifications for aliphatic naphthas, paraffinic hydrocarbons and aromatic hydrocarbons. Charts are used to simplify solvent selection and to present principal industrial uses. American Mineral Spirits Co. (Murray Hill, N.J.).

• **Sodium benzoate:** Folder briefly describes major applications for sodium benzoate and benzoic acid in wide range of industries. Hooker Chemical Co. (Niagara Falls, N.Y.).

• **Vinyl stearate:** 18-p. bulletin discusses physical properties, sol-

# Commercial laundries changing to higher quality dry bleaches




Symbols represent compounders using ACL-85 to produce improved dry bleaches requested by the commercial laundry industry.

ACL: Reg. U.S. Pat. Off.

## DOES YOUR BLEACH MEET THIS NEW DEMAND?

**In October 1957,** following extensive industry testing, Monsanto started commercial production of ACL-85 and related chlorinated cyanuric acids.

**Today,** ACL-85 has been accepted nationally as the new *standard* organic source of available chlorine for *higher quality* dry bleaches.

**The solid form** and high available chlorine content of ACL-85 make it ideal for easy and flexible compounding. Bleaches made with ACL-85 are easier and safer to handle and ship than liquid bleaches and can be made fully equivalent in performance to sodium hypochlorite solutions.

**Write or phone Monsanto for information and technical literature on ACL-85.**

Monsanto®

**MONSANTO CHEMICAL COMPANY**
Inorganic Chemicals Division
St. Louis 24, Missouri

## SALES

ubility, gum and resin solvency, monomer reactivity, polymerization, various copolymers, synthetic intermediate applications and tabulates 28 specific applications of vinyl stearate. Air Reduction Chemical Co. (New York).

• **Catalog:** Chart tabulates chemical formula, lbs/gal., color, specific gravity, analysis and container information for Eastman Chemicals' acids and anhydrides, aldehydes, aromatic intermediates, solvents, alcohols, plasticizers and several other products. Eastman Chemical Products, Inc. (Kingsport, Tenn.).

• **Plastic carboy:** Folder describes specifications for 5, 13 and 14 gal. polyethylene containers protected by steel drum overpacks (Jal Boys). Jones & Laughlin Steel Corp., Container Division (405 Lexington Ave., New York).

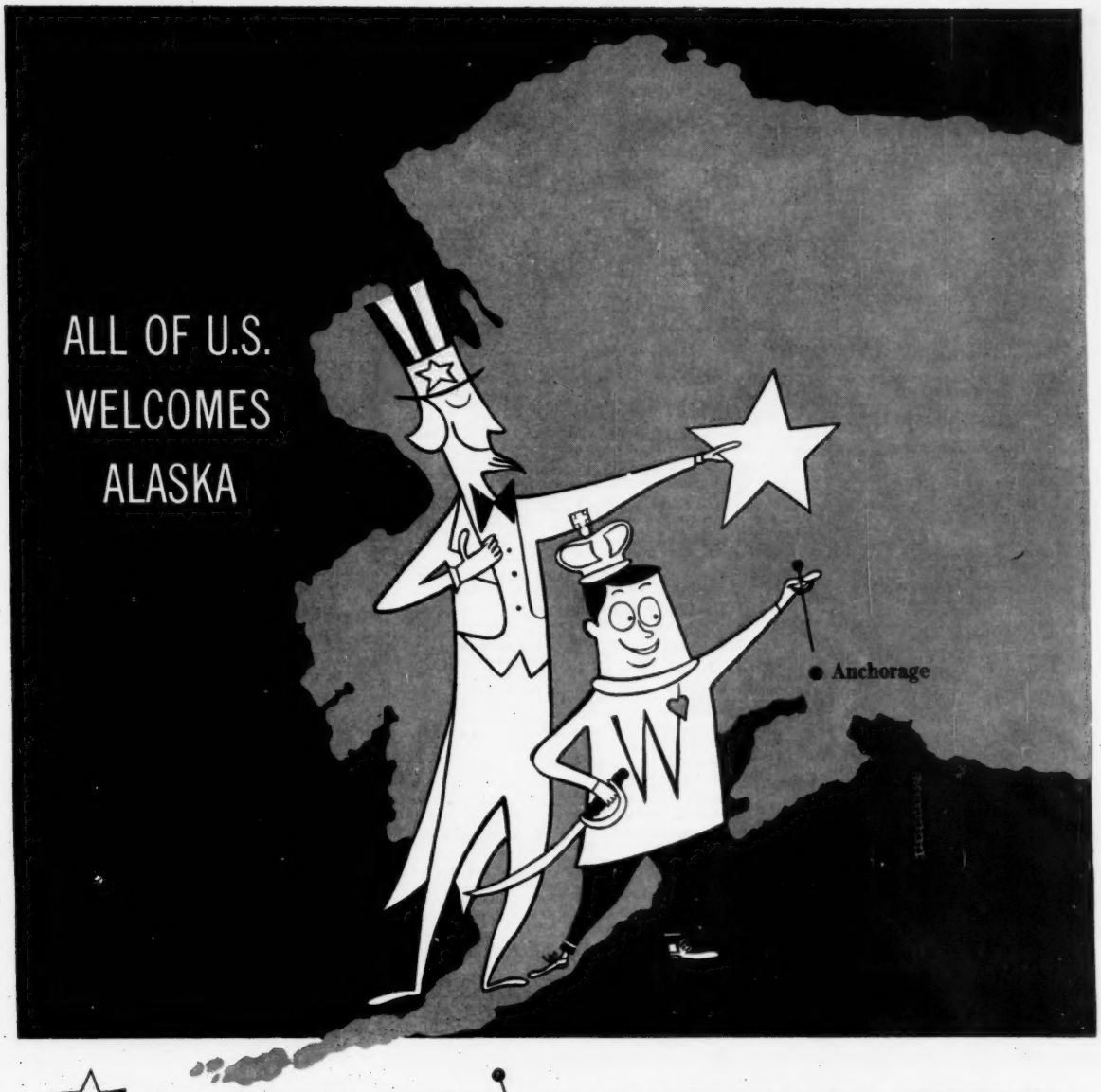
• **Silicone fluids:** New guide presents data on stability, volatility, oxidation and shear resistance, sound and light transmission, compressibility and other factors. Applications tell how silicone fluids can be used in damping, springing and coupling operations. Dow Corning Corp. (Midland, Mich.).

• **Surfactants:** High molecular weight carboxylic acids and sodium salts are subject of new bulletin describing Sarkosyl surfactants. Detailed descriptions of applications on cosmetics, toilet goods, food products, detergents, fungistats, metal finishing, drugs and petroleum products are presented. Geigy Chemical Corp. (Saw Mill River Road, Ardsley, N. Y.).

• **Polypropylene:** New 10-page booklet gives thermal, mechanical, permanence, electrical and other properties of new polypropylene resin. Hercules Powder Co. (Wilmington, Del.).

• **Pine oil replacement:** Folder gives brief technical description of Hodag PX-1, a combination of alcohols, hydrocarbons and surface-active agents. It can be used as an antifoam leveling agent and solvent. Hodag Chemical Corp. (7247 N. Central Park, Chicago 45, Ill.).

• **Plasticizer:** Harflex 375, a high-polymeric plasticizer is subject of 4-p. folder. Permanence and stability characteristics stressed. Data includes solubility, compatibility, and vinyl chloride resin test result information. Harchem Division, Wallace & Tiernan, Inc. (25 Main St., Belleville, N. J.).

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## September 6, 1958



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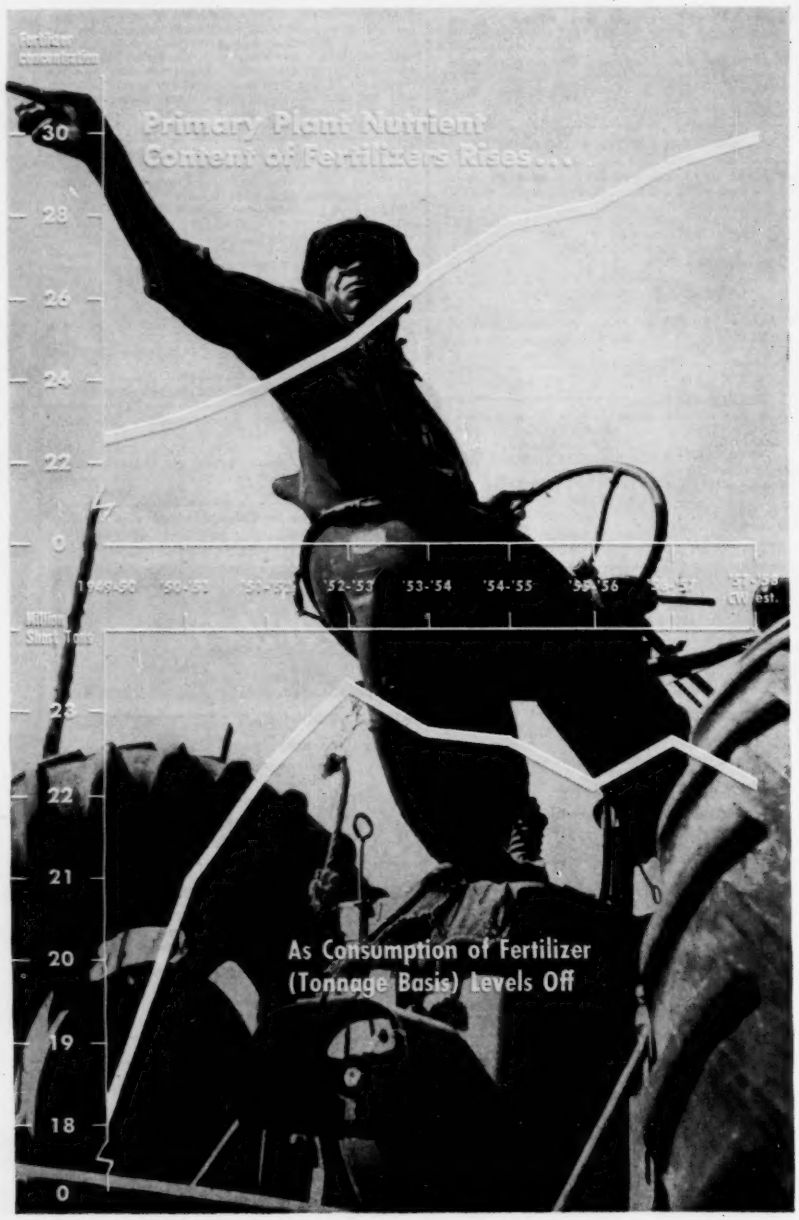
# Fertilizers Pack More Primary Nutrient




**At the close** of the '57-'58 agricultural year (July 1), total U.S. fertilizer consumption was estimated to have decreased to 22.2 millions tons, 2% under the 22.7 million tons consumed in the previous corresponding period.

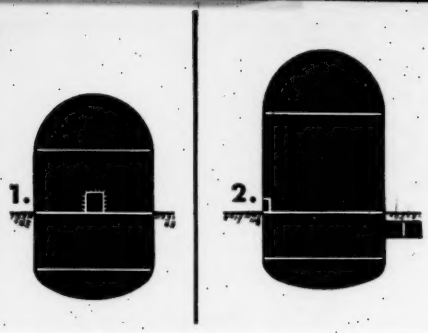
While fertilizer demand has leveled off, however, total consumption of primary plant nutrients has increased at a phenomenal rate. During '57-'58, some 6.4 million tons of available nitrogen, phosphorus and potash were used by U.S. farmers. That's 14% more than the 5.6 million tons applied to the soil during '52-'53, and some 60% more than the 4 million tons used in '49-'50.

Reason for such a healthy spurt is, of course, the trend toward higher nutrient concentration in fertilizers. In this past fertilizer season, the average primary plant-nutrient content was some 30% by weight; it was 23% in '49-'50.

Of the three primary plant nutrients, nitrogen has had by far the most spectacular growth. During the '57-'58 agricultural season, some 2.25 million tons were used for plant food. This is 100% more than the 1.1 million tons consumed in '49-'50.

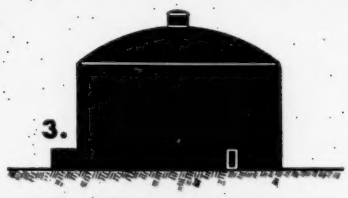
Demand for phosphorus has also moved briskly, while not at nitrogen's pace. During the past fertilizer season, some 2.3 million tons of available phosphorus were used. In '49-'50, about 1.9 million tons, some 21% less, were used. Latest potash use by the fertilizer industry is estimated at 1.9 million tons; it was 1.1 million tons in '49-'50.

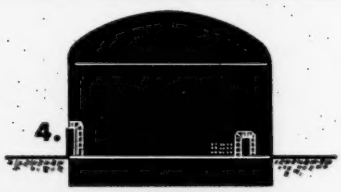
About 68% of the primary plant-nutrients were applied in the form of mixed fertilizers, while the remainder was applied directly (to provide a single primary plant nutrient). This ratio has changed little since '49-'50.

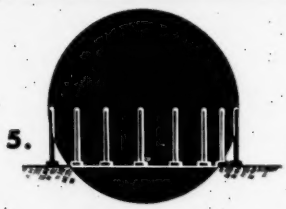



**LAST PLATES GO IN AT DRESDEN STATION.** 100-ton derrick with 170-foot mast lowers plates into place from 210-foot towers as 190-foot diameter Hortonsphere® nears completion at Dresden, Illinois Nuclear Power Station. CB&I-built structure will house atomic reactor. Station is a General Electric Co. project.

# SHAPES OF things to come in the atomic age




## CB&I Structures to Silhouette Major Reactor Projects

For CB&I engineers, fabricators and erection specialists, the challenge of things to come in the atomic age is, to a large extent, a reflection of existing accomplishments.

In 1954 the world's largest sphere, a Hortonsphere® measuring 225 feet in diameter, was built by CB&I for the AEC Knoll Atomic Power Laboratory at West Milton, New York, for testing a prototype of the atomic power plant which now serves our atom sub fleet.

Today, near Chicago, a skilled CB&I crew is completing the erection of a 190-foot diameter Hortonsphere to house an atomic reactor for the Dresden Nuclear Power Station. Near Detroit, another CB&I crew erected a reactor containment vessel of a different design for the Enrico Fermi Atomic Power Plant. Silhouettes of similar structures, being designed, fabricated or erected by CB&I, are shown here.

Yes, for CB&I, the shape of things to come in an atomic tomorrow had their beginnings *yesterday*. Experience gained in almost 70 years of furnishing *craftsmanship in steel* to serve Industry, Government and scientific research is now meeting the exacting requirements for reactor containment vessels.

E53CBR

1. Enrico Fermi Atomic Power Plant, Lagoona Beach, Michigan. (Power Reactor Development Co., Architect-Engineers)
2. U. S. Air Force, Dayton, Ohio
3. Atomic Energy Commission, Livermore, California. (Foster Wheeler Corp., Engineers)
4. Massachusetts Institute of Technology, Cambridge, Massachusetts. (John W. Cowper, Purchaser)
5. Dresden Nuclear Power Station, Dresden, Illinois. (Bechtel Corp., Constructor-Contractor)

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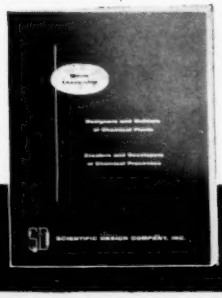

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